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CONTENTS

New viruses observed in children with respiratory diseases . . . <i>Robert M. Chanock, Robert H. Parrott, Joseph A. Bell, Wallace P. Rowe, and Robert J. Huebner</i>	193
Radiation as a public health problem <i>David E. Price</i>	197
Foodborne epidemic of group A beta hemolytic streptococcus <i>Robert E. Farber and Ferdinand A. Korff</i>	203
TPI and TPCF tests on 2,000 patients difficult to diagnose . <i>Ad Harris, Virginia H. Falcone, Lewis S. Price, and William J. Brown</i>	210
APHA conference report, 1957. A special section:	
Are we getting public health in tune with the times? . .	215
Current needs	217
School health	220
Food and diet	224
Mental health	229
Water, wastes, and safety	232
Chronic diseases	237
Dental health	241
Records and measurements	244
Maternal and child health	248
Manpower	251
Education	254
Medical care	255

Continued ►



frontispiece

An address before the opening ceremony of the 'Hall of Health' appears on page 261.

CONTENTS *continued*

	<i>Page</i>
The health message	261
<i>John D. Porterfield</i>	
Audiometric testing of school children	265
<i>Samuel M. Wishik, Elizabeth R. Kramm, and Elvira M. Koch</i>	
Milk sanitation honor roll for 1956-57	279
Employment availability of older people	283
Short reports and announcements:	
International classification of diseases revised	195
New members of the PHR Board of Editors	196
Graduate fellowships in public health	202
The Biophysical Society	209
The domestic migrant worker: PHS exhibit	214
Universities expand curriculums	260
Divorce and annulment data collection improved	264
Radiation detection through hair-root changes	282
International mail pouch	285
Publications	286

Published concurrently with this issue:

PUBLIC HEALTH MONOGRAPH NO. 51 . . . Availability for
work: Chronic disease and limitation of activity.

Philip S. Lawrence

44 pages. A summary and information on availability appear on pages
283-285.



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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

MARION B. FOLSOM, *Secretary*

PUBLIC HEALTH SERVICE

LEROY E. BURNEY, *Surgeon General*

Vol.

New Viruses Observed in Children With Respiratory Diseases

ROBERT M. CHANOCK, M.D., ROBERT H. PARROTT, M.D., JOSEPH A. BELL, M.D.,
WALLACE P. ROWE, M.D., and ROBERT J. HUEBNER, M.D.

EVENTUAL control of the common respiratory diseases depends on the determination of their etiology. Despite recent notable advances in delineating the viral etiology of such illnesses—at least 70 newly recognized viral agents have been described since 1948—the causes of most remain to be found. The preliminary report outlined here presents data on two new respiratory viruses which have been found in children with respiratory illnesses and which, while biologically related to influenza and mumps, are also quite distinct.

Previously unrecognized myxoviruses classified in two serologic groups were isolated from children with respiratory illnesses during October and November 1957 (1). These two new groups of agents, provisionally called hemadsorption (HA) viruses types 1 and 2, were isolated in monkey kidney cultures with the use of the hemadsorption technique recently introduced by Vogel and Shelokov (2, 3). Preliminary clinical and epidemiological observations indicated that these agents might be responsible for a proportion of the common acute respiratory illnesses in children which remain largely unexplained despite recent advances exemplified by the discovery of adenoviruses (4, 5) and other new agents (6-9).

The type 1 HA virus was isolated from 35

children, 8 of whom were studied in Washington, D. C., hospitals and 27 of whom were involved in an outbreak of febrile respiratory illness in a nursery group of a District of Columbia welfare institution (Junior Village). When throat swabs were collected on one day from all infants in the affected nursery and tested for HA viruses, epidemiological analysis indicated that there was a significant association of type 1 HA virus isolations with febrile illnesses (chi-square test indicated $P=0.03$), thus strongly suggesting but not proving an etiological relationship. The illnesses were characterized by fever of 2 to 3 days' duration and cough. Nearly half of the cases had moist medium to fine rales; several had coarse breath sounds and rhonchi.

Type 2 HA virus was isolated from three infants with acute laryngotracheobronchitis (croup), and more experience will be required with this agent before its etiological importance in disease can be determined.

Acute and convalescent serum specimens from patients yielding either type 1 or type 2 virus showed substantial antibody rises in complement fixation and hemagglutination inhibition tests. Specimens from 82 hospitalized patients without respiratory illnesses did not yield the two viruses.

The contribution of the HA viruses to the total respiratory disease picture cannot be assessed at this time. However, serologic data suggest that the contribution of these agents to childhood respiratory illnesses may be substantial. Preliminary surveys for antibodies against HA viruses in the serums of 55 adults,

Dr. Chanock, Dr. Bell, Dr. Rowe, and Dr. Huebner are all with the Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, Public Health Service. Dr. Parrott is physician-in-chief of Children's Hospital, Washington, D. C., with which Dr. Chanock is also associated.

nearly all young males, showed that all had neutralizing antibodies to type 1 virus, and 39 had neutralizing antibodies to type 2.

The following properties indicated that the HA viruses are members of the myxovirus family. Both types 1 and 2 HA viruses agglutinated guinea pig and chicken red cells: They propagated in the amniotic cavity of the embryonated hen's egg, they possessed erythrocyte

receptors sensitive to RDE (receptor destroying enzyme of *Vibrio cholerae* filtrate), and they were sensitive to ether.

Studies of the serologic relationships of HA viruses to other myxoviruses, as determined by the use of specific animal serum, are reported elsewhere (1). The table shows distinct immunological differences from influenza A, B, and C, mumps, and croup associated (CA)

Relationship of types 1 and 2 hemadsorption (HA) virus to certain myxoviruses, as shown by representative complement fixation tests with human serums

Infection, patient, and serum	Reciprocal of CF antibody titer with 4 units of indicated antigen									
	HA type 1 MK antigen ¹	HA type 2 MK antigen ¹	Influenza A Asian CAM antigen ²	Influenza B CAM antigen ²	Influenza C chick embryo extract antigen ³	Sendai		Mumps		CA MK antigen ¹
						CAM antigen	Allantoic fluid antigen	CAM antigen	Allantoic fluid antigen	
<i>Type 1 HA</i>										
Patient Ha:										
Acute.....	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Convalescent...	64	<8	<8	<8	<8	<8	<8	<8	<8	<8
Patient Mo:										
Acute.....	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Convalescent...	64	<8	<8	<8	<8	<8	<8	<8	<8	<8
<i>Type 2 HA</i>										
Patient Se:										
Acute.....	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Convalescent...	64	64	<8	<8	<8	<8	32	<8	<8	<8
Patient Se:										
Acute.....	16	<8	<8	<8	<8	<8	<8	<8	<8	<8
Convalescent...	64	64	<8	<8	<8	<8	32	<8	<8	<8
<i>Influenza A Asian</i>										
Patient Su:										
Acute.....	16	<8	<8							
Convalescent...	16	<8	32							
Patient Bu:										
Acute.....	16	<8	<8							
Convalescent...	16	<8	<32							
<i>Influenza B</i>										
Patient Ba:										
Acute.....	8	8		<8						
Convalescent...	<8	<8		64						
Patient St:										
Acute.....	32	16		<8						
Convalescent...	32	8		64						
<i>Influenza C</i>										
Patient Tr:										
Acute.....	8	<8			<8					
Convalescent...	8	<8			64					

¹ Monkey kidney tissue culture antigen.

² Chorio-allantoic membrane extract antigen centrifuged for 1 hour at 20,000 r.p.m.—group specific antigen.

³ Chick embryo extract antigen centrifuged for 1 hour at 30,000 r.p.m.

viruses, as shown through use of paired acute and convalescent serums from patients with HA and influenza virus infections.

In representative complement fixation tests, persons infected with both type 1 and type 2 showed no rises to influenza A, B, or C when tested against the group-specific CF antigens of these agents. Type 1 HA virus was shown to be different from Sendai, mumps, and CA viruses by these same serums. Type 2 HA virus was not related to mumps or CA virus, but showed a relationship to Sendai virus, which has recently been proposed as the prototype influenza D virus (10). Children who were infected with type 2 HA virus, and who developed complement fixing antibody for the homologous virus, also developed antibody for Sendai viral antigen but not for the Sendai chorio-allantoic membrane extract (soluble) antigen. Guinea pigs immunized with Sendai virus also developed CF antibody to type 2 HA virus, but in the hemagglutination inhibition and neutralization tests these agents were shown to be distinct (1).

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International Classification of Diseases Revised

The seventh revision of the Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, effective January 1958, to be used by the United States and other members of the World Health Organization for the next 10 years, is now available in two volumes, at \$3.50 for the set. The first volume contains the classification; the second, the alphabetical index. The Public Health Conference on Records and Statistics is again consolidating orders in the United States. Orders and checks payable to that organization may be addressed c/o Department of Health, Education, and Welfare, National Office of Vital Statistics, Washington 25, D. C.

**New Members
of the PHR
Board of Editors**



Dr. Chope



Mr. Hunter



Dr. Kidd



Dr. Langmuir



Dr. Sowder

Five new members will attend the April meeting of the Board of Editors of Public Health Reports. Retired from the Board are Harold M. Erickson, Lloyd Florio, Victor H. Haas, and Seward E. Miller.

Harold D. Chope, M.D., Dr.P.H., has been director of the San Mateo County (Calif.) Department of Public Health and Welfare since 1948. After taking his doctorate in public health from Harvard University (1940) where he had also been a Rockefeller Foundation fellow during work on his master's degree, he was, from 1940 to 1948, successively, associate in public health administration at Harvard; Rockefeller Foundation staff member in São Paulo, Brazil; and assistant district health officer, San Joaquin Local Health District, Stockton, Calif. Prior to 1940 he served as chief of the bureau of epidemiology, St. Louis City Health Department, assistant director of the California State Health Department, and health officer, Newton, Mass. From 1936 to 1941 he lectured at the Simmons School of Public Health Nursing and directed a field training unit at Harvard from 1935 to 1940. He was clinical professor of preventive medicine at Stanford University in 1955, and, from 1947 to the present, has been lecturer at the University of California School of Public Health.

J. Stewart Hunter, M.A., assistant to the Surgeon General of the Public Health Service since 1950, serves as staff adviser on public information and supervises the information and publications programs of the Service. From March 1953 until October 1955, at the request of the Department, he served as acting director of publications and reports for the Secretary of Health, Education, and Welfare. He came to the Service in June 1949 from a position as associate director of the public relations department of the Chicago office of J. Walter Thompson Co. After serving on the information staff of the Office of Price Administration during the early part of 1942, he saw active duty as lieutenant commander in the U. S. Naval Reserve from October 1942 to January 1946, the majority of the time as an officer on an aircraft carrier in the Pacific. Subsequently, he lectured in English at Northwestern University. He is a graduate

of the University of Pittsburgh, where he taught from 1930 to 1942, except during 1937-38, when he served as associate and managing editor of the *Pittsburgh Bulletin Index*.

Charles V. Kidd, Ph.D., has been chief of the Office of Research Planning of the National Institutes of Health, Public Health Service, since 1949. He is also executive secretary of the consultants on medical research and education to the Secretary of Health, Education, and Welfare. In 1947 he was executive secretary of the President's Scientific Research Board, and later was a staff member of the President's Council of Economic Advisers. He received a Rockefeller public service award in 1955. He took an A.B. from Princeton in 1935, a diploma in history from Munich in 1936, and a Harvard doctorate in 1957.

Alexander D. Langmuir, M.D., M.P.H., has been chief of the Epidemiology Branch, Communicable Disease Center, Public Health Service, since 1949. From August 1942 to July 1946, he was the epidemiologist of the Commission on Acute Respiratory Diseases of the Army Epidemiological Board, Fort Bragg, N. C. He served in the New York State Department of Health from February 1937 to August 1942 in various capacities, including that of deputy commissioner of health of Westchester County. Before coming to the Communicable Disease Center, he was associate professor of epidemiology at Johns Hopkins School of Hygiene and Public Health for 3 years. In 1955 he served as a member of the WHO Committee on Poliomyelitis Vaccine. Since 1947 he has been consultant on biological warfare to the Secretary of Defense.

Wilson T. Sowder, M.D., M.P.H., Florida State health officer for the last 13 years, entered the Public Health Service as a commissioned officer in 1934. He served in hospitals, quarantine stations, and the Coast Guard, and in venereal disease control work in Tennessee and Florida. He was also a consultant on communicable diseases in the War Shipping Administration and consultant in the Service's regional office in Dallas, Tex., until his resignation in 1956 from the Regular Corps to remain in Florida. He took his medical degree in 1932 from the University of Virginia, and his master's degree in public health from the Johns Hopkins University in 1939.

Radiation as a Public Health Problem

DAVID E. PRICE, M.D.

TO BE CLASSIFIED as a public health problem, a hazard must bear an important relationship to human health or disease. It must, furthermore, affect a significant part of the population, and it must be amenable to remedial action which is within the power of society to undertake.

Unquestionably, ionizing radiation meets the first two of these criteria. It has a relationship to human health and affects a significant part of the population. However, the design of social action deserves thoughtful consideration.

Past experience in public health has taught us that a problem usually becomes rather serious before people band together to deal with it. Only when a considerable amount of disease could be traced to polluted water did we begin to develop sewage treatment and other antipollution measures. Only when motor accidents had taken an alarming toll did citizens insist on better roads, safety devices, and various accident prevention programs. Traditionally, and in the main this is probably one of mankind's happier traits, we do not go looking for trouble. Not until the trouble looms so large it can no longer be ignored do we find the incentive to band together and pool resources—neighborhood, city, State, or Nation—to do something about it.

In dealing with the health hazards of ionizing radiation, unfortunately, this traditional approach cannot promise success. The effects of ionizing radiation are cumulative and irreversible. They are subtle and may become ap-

parent only after long delay. If we wait until there are obvious signs of radiation damage it will be too late to help the affected population or to decontaminate the polluted environment successfully. In this situation, prevention is not merely desirable, it is imperative.

Finding the proper incentive to stimulate preventive action, however, is not easy. In my opinion, to use fear as the incentive for action is not only unwarranted and undesirable, but useless. Panic or hysteria seldom results in constructive activity. Factual information may stimulate constructive public action. The public should know what public health workers are doing to promote radiological health and what more they think they ought to be doing.

Since we do not yet know at what point the harmful effects of prolonged, low-level exposure may outweigh the benefits of manmade radiation, we suggest that all unnecessary radiation exposure should be avoided. Consequently, much of our efforts in public health thus far are being directed toward finding what exposure is unnecessary and how it can be avoided.

Reducing X-ray Exposure

One of the major sources of radiation exposure today is the X-ray. If we can reduce needless exposure to X-ray without reducing its manifold benefits in the detection and treatment of disease, we have taken a significant step toward reducing the dimensions of the radiation exposure hazard. Much health agency activity in the radiological field is currently directed toward this goal.

For example, public health agencies for several years have been making a concerted drive to eliminate the use of the fluoroscopic shoe-

Dr. Price, chief of the Bureau of State Services, Public Health Service, delivered this address at a symposium of the American Association for the Advancement of Science, Indianapolis, December 30, 1957.

fitting machine. This machine serves absolutely no practical purpose. Moreover, if a child uses it each time he gets a new pair of shoes, he gets a considerable dosage of radiation over the years particularly since many of these machines deliver a scattered dose over a rather large part of the body. This is obviously a source of radiation that can be eliminated without the sacrifice of any beneficial result. The shoe industry has been cooperative. Shop owners, once they are fully informed of the facts, seldom show any reluctance to remove these machines. The main reason this type of shoe-fitter continues to be used is because there are not enough people, health officials or others, who have the information, the time, and the interest to work on the drive to eliminate this hazard.

Another example of unnecessary exposure is the indiscriminate use of the X-ray in tuberculosis surveys. When tuberculosis was more widely prevalent, communitywide mass X-ray surveys were justified. The early case finding from such surveys has unquestionably saved thousands of lives. There are still communities in the United States today where the prevalence of the disease makes mass X-ray campaigns desirable. However, there are other groups of people among whom the disease is so rare that the mass X-ray approach is no longer the best case-finding method. Consequently, the Public Health Service has recently recommended a more selective use of this procedure.

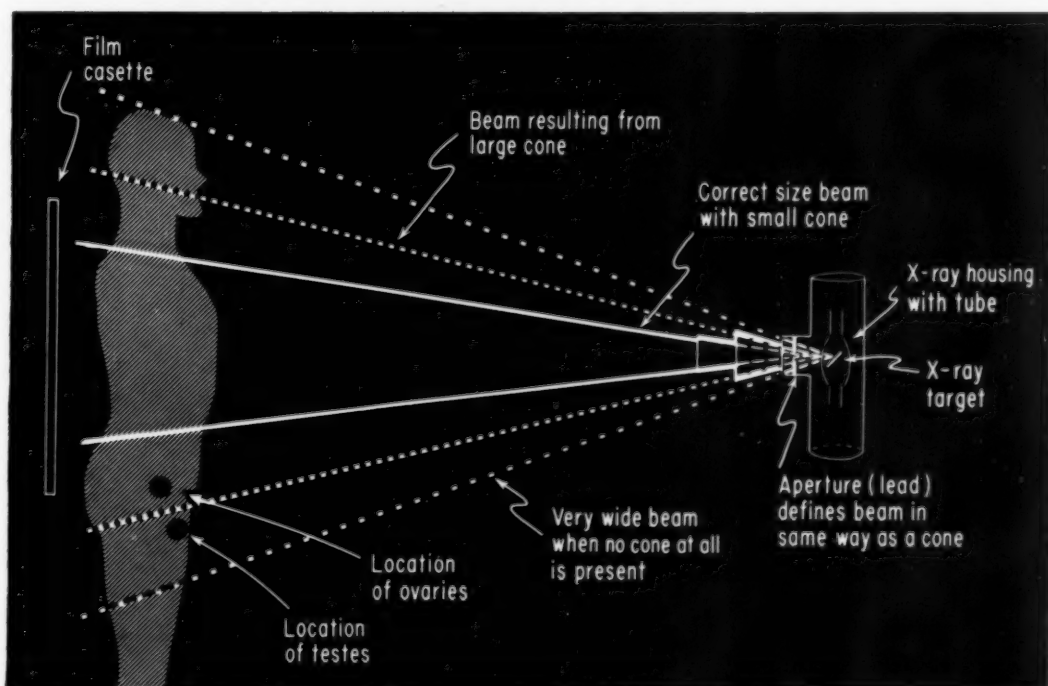
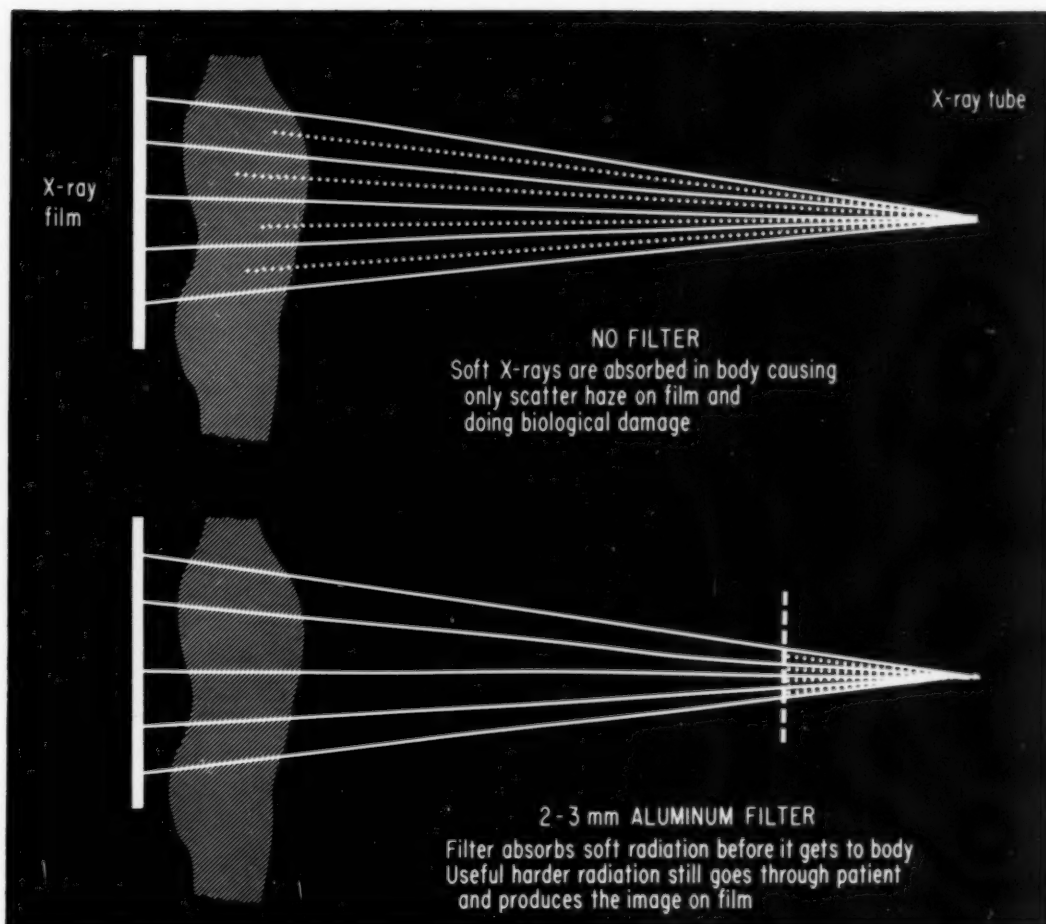
Interestingly enough, when this recommendation was publicly announced, it was interpreted by some as implying that mass X-rays were especially hazardous and that the Public Health Service opposed their use. This is an example of the emotional exaggeration that creates unwarranted fears and hampers constructive efforts to promote health objectives. Any general reluctance on the part of the public to accept diagnostic X-rays, when recommended by responsible authorities, would certainly be far more injurious to health than would the slight additional amount of radiation exposure. The vast majority of papers and other mass media made it clear that the individual X-ray in itself is not hazardous and that in areas where tuberculosis is prevalent mass X-ray surveys are still a valuable case-finding technique.



(Above) Without impairment of X-ray pictures, technicians adjust cones, filters, distance, and voltage so as to reduce radiation doses as much as 75 percent. The white strips on the model fluoresce under radiation to indicate exposure of strategic tissues, during demonstrations of X-ray techniques conducted by the Public Health Service. Dr. Walter Stahl points to charts (opposite page) which explain the value of these adjustments. Accompanying tables show the dose to different organs under various conditions.

(Top right) An aluminum plate absorbs soft X-rays, which lack energy to pass through the patient directly to the radiographic plate. Soft X-rays fuzz the X-ray picture and contribute an unnecessary dose to the patient. A cone, absent here, would further confine the dose.

(Below right) Too large a cone, or complete absence of a cone, permits beams intended for a chest plate to strike organs which should be protected. Even with a correct cone, irrelevant portions of the body may receive a radiation dose if the tube is too far from the patient.



A third example of the opportunity to reduce unnecessary exposure to X-ray lies in the reduction of the radiation doses delivered in medical and dental examinations. It is an unfortunate fact that many of the more than 160,000 X-ray machines being used in the healing arts today deliver a higher dose of radiation than is necessary. There is room for much improvement both in the machines themselves and in the techniques of their use. To drive home this point, our radiologists use a wax model taped and instrumented to show radiation dosage. They take a chest X-ray with typical equipment and employ a commonly used technique. Then, changing the cone of the machine, focusing more precisely, and making a few other adjustments, they take an equally useful film, but expose the monitored tissues to only 1/35th as much radiation.

Several studies now under way within the Public Health Service are designed to perfect techniques that will produce films of maximum value with minimum exposure and to provide better measurement of the doses delivered. Hand in hand with such studies, however, must go the training of technicians to make use of the equipment and procedures which are already available and which reduce substantially the radiation dosage received by both the patient and the operator.

Other studies are being carried out by public health personnel at all levels of government to reduce unnecessary X-ray exposure. As more physicians, dentists, and other members of the healing arts become aware of all that they can do to prevent unnecessary exposure, the X-ray hazard can be controlled. The problem is primarily one of research and of getting the findings of such research to professional groups, most of whom will readily understand their significance and apply them to their practice.

Measuring Environmental Radiation

The development of nuclear energy brings new significance to every effort to minimize exposure so that hazards may be balanced against the benefits of radiation not only in the healing arts but also in industry.

Therefore, along with drives against unnecessary X-ray exposure, health agencies are con-

New Radiological Health Division

On recommendation of the Surgeon General and approval of the Secretary of Health, Education, and Welfare, a Division of Radiological Health has been set up in the Bureau of State Services with Francis J. Weber, M.D., as chief. Dr. Weber, a commissioned officer of the Public Health Service, comes from Region 8, Department of Health, Education, and Welfare, Denver, Colo., where he was regional medical director.

cerning themselves with environmental sources of radiation.

Before he split the atom, man gave little thought to the background radiation in nature. Consequently, although we know that there is great variation in the background radiation of different localities, we have little information about what these levels are for any given area or for its air, water, or food. Obviously, it is necessary to have such information in order to determine how much radiation manmade sources are adding to the environment. Moreover, the time when we can obtain such data is fast slipping away. Ideally, these baseline studies should have been made before the first atom was split. Nevertheless, if we get this information as rapidly as possible, it will still be extremely valuable in helping us to make better health evaluations of exposure doses.

Baseline data are now being obtained on a limited scale. The focus of most of these monitoring activities is within the Atomic Energy Commission. However, the Public Health Service, in cooperation with State health departments and community groups, has operated for the past 5 years some 100 air and rain surveillance stations in order to measure community air pollutants, including radioactive pollutants. More recently, the Service has established about 40 stations for surveillance of water pollution. Here, too, analysis of collected samples includes radioactive pollution. The only food study in which the Public Health Service is currently participating is the collection and analysis of milk for strontium-90 and other radioactive elements. These studies are being conducted in five major milk shed areas.

The Food and Drug Administration is conducting other limited surveys. All of these baseline studies need to be expanded . . . now.

Baseline data are needed as a guide in the selection of reactor sites and as a gauge for determining how much and how rapidly radioactive waste from industry and from fallout is being added to the environment in any given area.

Such data may also prove helpful in the development of epidemiological studies. To date, studies of permissible radiation doses have been based primarily on observations of persons exposed to abnormally high radiation dosages and are, at best, estimates. In order to evaluate the public health significance of radiation, we need to devise means of measuring the far more subtle effects of prolonged, low-level exposure. Since the damage from this type of exposure extends over years and generations, the difficulties of the measurement task are too obvious to need delineation here. We place a high priority on such research. The information is needed not only to provide a better basis for establishing practical radiation dose limits but also to relieve the public of those exaggerated fears which inevitably occur when one is dealing with unknowns.

The increasing public awareness and concern about radiation exposure has been focused primarily on the matter of weapons testing. A far more important potential source of environmental radiation exposure is the rapidly growing number of power reactors based on nuclear fission. For this reason, long before the Shippingport, Pa., atomic power plant began operating in December 1957, health personnel, both Federal and State, were working closely with the designers of that installation. Radiation specialists from the Public Health Service and the Pennsylvania Health Department participated in planning the installation and operation of the waste treatment system at the Shippingport reactor. This collaboration includes baseline studies of the Ohio River system, the receiving stream.

The Shippingport operation has given industry, the Atomic Energy Commission, and the Federal-State health services an excellent opportunity to work out a practical pattern of

cooperation in the interest of public health safety. This cooperation will continue, and operating experience will provide an opportunity to test theory against practice.

A pioneering operation such as this naturally commands the careful and personal attention of highly trained experts. But what is going to happen as the industry expands? Will the same precautions always be taken? Traditionally, State agencies, and in most States, it is the health department, have assumed responsibility for seeing that every industry within their jurisdiction operates in such a way as not to endanger the health of the workers or of the other citizens of the community. Public health supervision of radiation sources in industry is therefore not a totally new concept. It fits into the existing pattern of industry and health department relationships. But it does present new challenges.

Will States and communities accept these challenges in time? To date, there are radiological health programs in only a few State health departments. All States need them. To date, only a few communities have any accurate idea of the sources and amounts of radiation to which their people are exposed. Every community should be taking this first step of assessing the radiation burden.

It will not long be feasible for the public to rely entirely on the users of radiation sources for assurance of community health protection. As nuclear sources of power begin to compete with conventional sources, there will undoubtedly be severe economic pressures to lower operating and capital costs. The public health agencies should be prepared to assure that such economies are not made at the expense of public health considerations.

Three Major Challenges

Summing up, radiation presents three major challenges to the public health profession. First, the public must be alerted to the need for greatly expanded radiological health programs which can provide security from fears that would hamper the constructive development of atomic industry and atomic medicine. Public understanding is basic because adequate radiological health programs require both legal au-

thority and financial support on a scale possible only when there is general public acceptance.

The second big problem is that of trained manpower. Radiological health is a specialized field with concepts, vocabulary, units of measurement, and sensitive instrumentation of its own. With the increase of radiation sources, there must be a corresponding growth in health personnel who have the training required to provide planning, surveillance, and other services. However, since highly trained specialists are produced slowly and since there is much to be done right now, the Public Health Service is providing practical training to the existing staffs of State and local health departments. This is done by courses and seminars designed to instruct trainers, persons who can conduct similar programs in their own areas. In addition, the corps of specialists needed as teachers and researchers must be increased. For this task, we look to our colleges and universities.

The third major need is research. I have touched upon the need to know the probable doses and the biological effects. The engineering field is presented with equally momentous challenges. For example, we have yet to find a satisfactory and economical method of disposing of high-level radioactive waste. The Atomic Energy Commission already has more than 65 million gallons of radioactive waste buried in tanks in the earth. As the Nation becomes dotted with nuclear energy plants, what is to be done with these high-level wastes? We are getting by at present with temporary expedients; we must seek long-range solutions.

In conclusion, I say again that, from a public health standpoint, radiation is still a preventable health hazard. I believe we can keep it so, if we act now. Since we recognize that all radiation is harmful and that its effects are cumulative and irreversible, the price of delay in the vigorous pursuit of research and control efforts might well prove to be intolerably high.

Graduate Fellowships in Public Health

Through projects in Massachusetts, Louisiana, and California, fellowships of \$2,500 are available for the second year of graduate study to social workers interested in the field of public health.

With assistance from the Children's Bureau, the health departments of the States have set up educational programs focused on social work practice in public health, in schools of social work. Participating are the schools of social work at Boston College, Boston University, Simmons College in Boston; Tulane University School of Social Work; and the University of California School of Social Welfare, Berkeley.

The University of California is also offering fellowships of \$3,600 for a year of supervised practice in public health following completion of the second graduate year.

Further information about these fellowships may be obtained by writing to the dean of any of these schools of social work. Applications should be made before April 15, 1958.

Foodborne Epidemic of Group A Beta Hemolytic Streptococcus

ROBERT E. FARBER, M.D., M.P.H., and FERDINAND A. KORFF, B.S.

A SUDDEN extensive outbreak of beta hemolytic streptococcal sore throat occurred in Baltimore, Md., during February 1957. The Baltimore City Health Department, investigating the outbreak, found that an estimated 600 individuals became ill following attendance of a charity luncheon by more than 800 people, mostly women.

Several members of the organization which sponsored the luncheon procured and prepared most of the food served. A commercial caterer and a restaurateur assisted in the preparation of some of the food. The menu consisted of egg salad, tuna fish salad, macaroni with cheese, cottage cheese with nuts and cherries, pickles and olives, ice cream, coffee, and cookies.

Epidemiologically, egg salad, the probable vehicle of the outbreak, is of interest because recent literature reveals three instances in which eggs were the vehicle of transmission for streptococcus infection (1-3).

The specific causative organism, group A, type 25, beta hemolytic streptococcus which was recovered from patients, is one of the types of streptococci reported as being nephrotoxic by Rammelkamp and others (4-7).

Epidemiological Studies

A questionnaire was distributed 1 week after the luncheon to as many people who had attended as possible. It soon became apparent

Dr. Farber is director of the bureau of communicable diseases, and Mr. Korff is director of the bureau of food control, in the Baltimore City Health Department, Baltimore, Md.

that it would be impossible to reach all of these people, since there was not a complete roster of the guests.

Because of the incomplete roster and because of the possibility that the questionnaires would be returned primarily by those ill, it was decided to base the epidemiological investigation primarily on the information obtained from the 96 members of the organization.

The questionnaire requested the following information: clinical details of the illness, time of onset of the illness, name of the attending physician, a history of foods eaten at the luncheon, a statement on whether any food had been taken home and, if so, who had eaten it and with what result.

Of the 96 members of the organization 6 had not attended the luncheon and 4 could not be found for questioning. Of the remaining 86 members, 60 had become ill with sore throats, giving an attack rate of 70 percent. Since it is reasonable to assume that the attack rate of this group is unbiased, it follows that of the 800 to 900 who attended the luncheon, some 500 to 600 probably became ill. This figure does not include secondary cases or those who were made ill by food brought home.

Figure 1 gives the frequency distribution in hours of onset of the illness following the luncheon. The shape of the curve, although slightly skewed to the right, is nevertheless consistent with the hypothesis of a common source epidemic.

By plotting the cumulative percentage of cases against the logarithms of the times of onset on normal probability paper (fig. 2) according to the method of Sartwell (8), the

points fall approximately along a straight line in a log normal fashion. From this graph the median incubation is estimated to be 31-32 hours, with 90 percent of the cases occurring within 65 hours following the luncheon. In the Fort Bragg outbreak (1) the estimated median incubation period was 38 hours, and in the Catskill epidemic reported by Sartwell (8) it was 56 hours.

Of the 60 members who became ill, all except 1 had a sore throat; 40, or 66.7 percent, had fever; 32, or 53.3 percent, had headaches; vomiting was reported by 11.5 percent, and 6.7 percent experienced diarrhea. There were no reported instances of a skin rash. There were no fatal cases.

Table 1 summarizes attack rates according to the food histories given by the 86 organization members. The outstanding observation is that, of 65 individuals who ate egg salad, 83 percent subsequently became ill and among the remaining 21 who did not eat egg salad, 29 percent became ill. For each food, the noneaters serve as a control for those who gave a history of

Figure 1. Frequency distribution of persons attacked, by time of onset of illness.

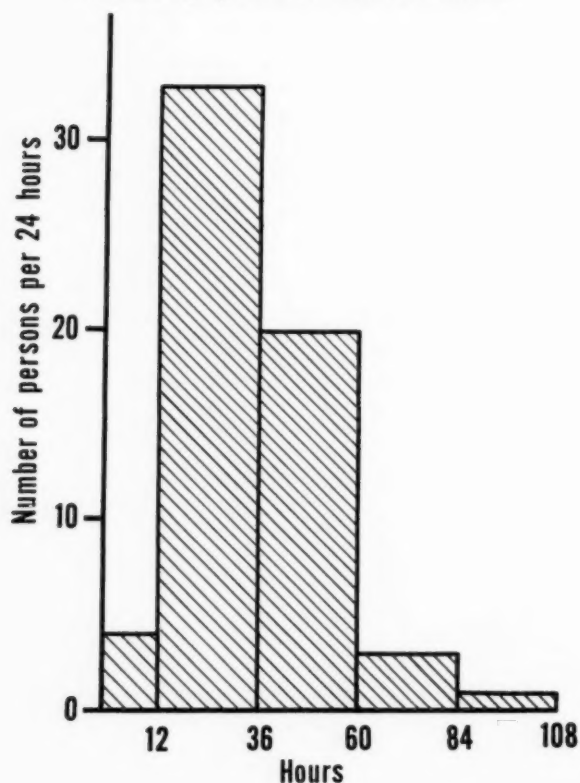
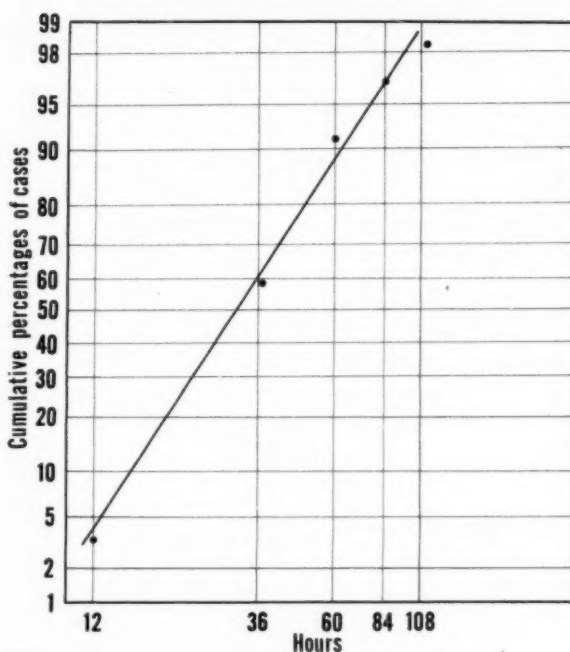


Figure 2. Cumulative distribution of persons attacked, by time of onset of illness.



eating. Where the attack rate differs significantly between the consumers and the nonconsumers, the foodstuff is said to be associated with the illness and is suspect as the vehicle of the illness. In the present investigation, egg salad and tuna fish salad are thus conjectured as possible sources of infection, egg salad showing a far higher association.

A factorial analysis, shown in table 2, indicates that among those who ate tuna fish salad, the attack rate was significantly determined by the consumption of egg salad. However, among those who ate egg salad, a history of tuna fish salad eating was not significant as a determinant of illness. These facts would seem to indicate that egg salad was the vehicle of the illness.

Further support for incrimination of the egg salad is provided by the analysis of the incidence of illness among husbands and other family members who were not in attendance at the luncheon, but who ate the leftover food brought home by the ladies. As shown in table 3, of those who ate the egg salad only, 71 percent became ill; whereas of those who ate the tuna fish salad only, 13 percent became ill. Of those who ate both egg salad and tuna fish salad, 59 percent became ill. There are certain limitations, of course, in this analysis. The in-

Table 1. Attack rates, according to food history

Food	Persons who ate specified food			Persons who did not eat specified food				
	Total number	Number ill	Percent ill	Total number	Number ill	Percent ill	χ^2	¹ P
Egg salad.....	65	54	83.1	21	6	28.6	24.75	<.01
Macaroni and cheese.....	34	26	76.5	52	34	65.4	.95	>.05
Cottage cheese.....	56	40	71.4	30	20	66.7	.25	>.05
Tuna fish salad.....	63	49	77.8	23	11	47.8	7.02	<.01
Ice cream.....	40	31	77.5	46	29	63.0	1.99	>.05

¹ Values shown represent probabilities that observed differences could have occurred by chance. Values of $P < .05$ indicate statistically significant differences.

cidence of illness among members of the households who did not eat the leftover foods was not obtained. This information could have provided an estimate of the expected incidence in the absence of a history of exposure to suspected foods, either due to spread of the agent (secondary cases) or unconnected with the episode.

Investigation of the preparation of the foods strengthened the evidence that the egg salad was the vehicle of spread. The tuna fish salad and cottage cheese had been prepared by the caterer, whereas the egg salad had been prepared by the restaurateur. The tuna fish had been supplied in unopened cans to the caterer, and the mayonnaise was a well-known commercial brand in large unopened gallon jars. The cottage cheese was secured from one of the large milk plants in Baltimore City. The macaroni and cheese had been prepared at the luncheon and served hot.

The raw eggs for the egg salad were obtained from various sources by the ladies of the organi-

zation. In the homes of eight members they were hard-boiled and shelled by the ladies with the help of maids and others on Monday, February 4. The hard-boiled eggs were then collected from these homes and delivered to the restaurateur some time on Tuesday, February 5, the day before the luncheon.

At the restaurateur's, on the evening of February 5, the peeled, boiled eggs were cut by machine and mixed with washed, cut-up celery. The room temperature was said to be between 78° to 82° F. Mayonnaise from the original containers, seasoning, and a quantity of mashed potatoes were added. This mixture was excessively handled, being run through the grinder three times, and then put in plastic bags of approximately 25 pounds each. These were sealed and placed in the restaurant refrigerator for approximately 9 hours at a temperature reported as 34° F. There are indications that this food was not completely chilled until after many hours storage in the refrigerator.

Table 2. Attack rates, comparison of egg salad with tuna fish salad

Food eaten	Total number	Number ill	Percent ill	P
Egg salad without tuna fish salad.....	12	8	66.7	} >.05
Egg salad with tuna fish salad.....	53	46	86.8	
Total.....	65	54	83.1	
Tuna fish salad without egg salad.....	10	3	30.0	} <.01
Tuna fish salad with egg salad.....	53	46	86.8	
Total.....	63	49	77.8	
Neither egg salad nor tuna fish salad.....	11	3	27.3	

Table 3. Attack rates, not present at luncheon but eating food brought home

Food taken home	Number eating food	Number ill	Percent ill
Egg salad only-----	38	27	71.1
Tuna fish salad only-----	15	2	13.3
Egg salad and tuna fish salad-----	21	12	57.1

Upon investigation of the food handlers at the restaurateur's where the egg salad had been prepared, it was discovered that one of them had been examined at a local hospital for severe cellulitis of his left hand on February 7, the day following the luncheon and 2 days following the preparation of the egg salad. The following is an abstract of his hospital outpatient record:

Present illness: Patient states that on several occasions he has had pus pimples on his hands. This time, the present episode began yesterday, and his left hand became swollen and sore. There are also pus pimples on the right hand.

Physical examination: Discloses erythema and edema of fingers of the left hand, and also hand itself is edematous. Increased temperature in area. Linear red streak up the flexor surface of left forearm and up the arm into the left axilla where there is a large axillary adenitis present.

Diagnosis: Pustular dermatitis, both hands; cellulitis, left hand; lymphangitis, left arm; lymphadenitis, left axilla.

No cultures from the food handler were taken at the hospital. Cultures from this man's hand and throat were subsequently obtained in the Baltimore City Health Department on February 11, 6 days after the preparation of the egg salad. In addition, throat cultures and hand cultures were taken on February 11 from 2 other food handlers who likewise were involved in the preparation of the egg salad. The report on these cultures will be discussed under the laboratory findings.

The food handler with cellulitis insisted that his hands were normal at the time of the preparation of the egg salad and that they did not become sore until 24 hours later. This fact is borne out in the above abstract from the hospital record where it is clearly stated that the infection of the hands began "yesterday," that

is, on February 6, the day after preparation of the egg salad. This information in the hospital record was given before there was any suspicion that a foodborne epidemic was involved. The previous occurrences of "pus pimples," according to the food handler, followed exposure to mayonnaise, vinegar, and certain detergents. They may have represented contact dermatitis.

Laboratory Findings

Six throat cultures were obtained from patients who had attended the luncheon. Four of these were taken by the health officer and two by a private physician on February 8, 2 days after the luncheon. These cultures were examined in the laboratories of the Baltimore City Health Department and typed at the Johns Hopkins School of Hygiene and Public Health. Five cultures were reported to have grown beta hemolytic streptococcus, group A, using the Taxos disk method. From the sixth culture an alpha streptococcus and a hemolytic, pigmented, coagulose positive staphylococcus were isolated. Further typing of the group A culture indicated that 3 of the 5 were type 25; one was untypable and the fifth culture was group C instead of the originally thought group A.

Throat cultures taken on February 11 from the 3 food handlers who had prepared the egg salad showed beta hemolytic streptococci, which were later typed as group A, type 25. It is of interest that the food handler with cellulitis of the left hand still had a positive throat culture in spite of 3 intramuscular injections of 600,000 units of penicillin, given on February 7, 8, and 11.

Cultures from the hands of these food handlers, including the one with cellulitis, were negative for beta hemolytic streptococci.

Bacteriological examinations of the samples of the egg salad, tuna fish salad, and cottage cheese were done as follows: 10 grams of each were emulsified in 90 cc. of sterile buffered distilled water. Serial dilutions were made and plated for total and coliform counts. A tenth of a cubic centimeter of the emulsion was plated on Teague's EMB, blood, tellurite glycine, and desoxycholate lactose saccharose citrate agars. Selenite enrichment broth was also inoculated

for plating in 24 hours. The organisms isolated were tested for biochemical reactions and in the case of the pigmented staphylococci, the Stone's agar and coagulose reactions were tested.

Beta hemolytic streptococci were not isolated from any of the food samples, but the egg salad was heavily contaminated with *Escherichia coli*; hemolytic, pigmented staphylococci; and alpha streptococci. From the cottage cheese a hemolytic pigmented staphylococcus and an alpha streptococcus were isolated. Only an alpha streptococcus was isolated from the tuna fish salad.

Four weeks after the luncheon 9 throat cultures were taken at random from 9 women who had had acute sore throats following the luncheon. Of these, three were positive for a group A, type 25, beta hemolytic streptococcus. At the time the cultures were taken, all of these ladies were asymptomatic and had apparently fully recovered from their acute illness. None of the nine had been cultured previously in the investigation.

Thus, group A, type 25, beta hemolytic streptococci were isolated from 3 of 6 attendants at the luncheon who were cultured 2 days later, from all 3 food handlers cultured 5 days after the luncheon, who prepared the egg salad, and from 3 of 9 attendants at the luncheon who were cultured 4 weeks later.

Complications

Since the causative organism, group A, type 25, beta hemolytic streptococcus, had been cited as being nephrotoxic, a survey was initiated to estimate the frequency of nephritic as well as other complications. The survey was timed to coincide with the maximum time interval between the acute sore throat and the onset of possible nephritis, that is, 21-28 days (9). Physicians practicing in the area where the majority of the patients lived were questioned and alerted to this possibility. Questionnaires were sent to 47 of the physicians known to have treated some of the patients. Of these, 33 responded and reported that they had treated a total of 310 patients. None of these patients was reported to have had any signs of nephritis within 5 weeks after the acute attack; 51 of the 310 had recurrences of sore throat after ap-

parent initial recovery. Other complications reported were 3 cases of sinusitis and 3 cases of otitis media.

In addition to the questionnaires to the physicians, single urine specimens were obtained by the public health nurses of the Baltimore Health Department from 97 of the ladies, including members and nonmembers, who had had sore throats. The specimens were obtained during the fourth week following the acute illness. These 97 specimens were tested within 6 hours of collection for the presence of albumin and red blood cells. All of the tests were negative except one which showed a two-plus albumin and 1 to 2 red blood cells per high-power field. In this latter case, the patient's personal physician was contacted and his further investigation revealed no evidence of nephritis.

Discussion

The estimated primary attack rate for this foodborne streptococcus outbreak, 69.8 percent, was high compared with other reported outbreaks. The Fort Bragg attack rate was 41.7 percent, of which 91 percent were primary cases and 9 percent were carriers (1). There are several possible explanations for this difference. The causative organism in the present outbreak may have been new to this community so that the number of previously immune individuals was low. Since the typing of streptococci is a recently adopted procedure and not regularly performed, there is no evidence to refute or substantiate this possibility.

A more likely possibility derives from the fact that both the health department investigators and the private physicians gained the impression that several of the so-called patients were not truly infected but merely had psychosomatic complaints. In addition, the fact that only two-thirds of the reported patients had fever seems unusually low for streptococcal sore throat and therefore supports this contention.

Consistent epidemiological evidence suggests egg salad was the vehicle for the disease: first, the epidemic curve indicated that the reported disease was due to a common vehicle; second, the analysis of attack rates according to foods

consumed implicates egg salad as the determinant of the sore throat; third, the analysis of attack rates among those who ate food brought home from the luncheon also points to the egg salad; and fourth, the causative organism was isolated from the throats of the food handlers who prepared the egg salad. The failure to isolate the organism from the egg salad may perhaps be explained by the fact that at the time food samples were cultured, the egg salad was at least 72 hours old, and the eggs themselves had been shelled approximately 96 hours. Presumably, any beta hemolytic streptococci that might have been present could have been overgrown with other organisms.

The inability to find the causative organism in the vehicle demonstrates the need for epidemiological investigation of all illnesses attributed to food, and the inherent limitations in inferences based solely upon the results of analyses of residues of food served. Food available for examination following any outbreak of illness is food that has not been eaten, and unless of liquid consistency a negative finding cannot be considered to refute the epidemiological findings.

The means by which the egg salad was contaminated pose an interesting question. If we accept the possibility that the man with cellulitis was a victim rather than the initiator of the outbreak, then we must look elsewhere for the mode of infection of the egg salad.

Any one of the ladies, or their maids and other helpers, who helped to prepare the eggs could have been a carrier of the streptococcus and could have coughed or sneezed inadvertently over her pile of shelled hard-boiled eggs. If the eggs were so inoculated and improperly refrigerated overnight in the ladies' homes, an ample growth of streptococci could have been present the next day when the eggs were delivered to the restaurateur.

The food handler could have been infected when he was putting the eggs through the cutting machine. An attempt to test this hypothesis was made. All the ladies involved in the preparation of the eggs were questioned, but they denied any infection or illness prior to the luncheon either in themselves or in members of their families. Of these 8 ladies all but 2 became ill 24 to 48 hours after the luncheon.

In addition, absentee records of schools in the vicinity were examined for evidence of sore throats. The only apparently pertinent information thus obtained was that the young son of one of the members was sick with a sore throat and fever 4 days before the luncheon. Investigation of this lead revealed that the whole family except the mother had been sick. The mother however could not be connected with the preparation of the eggs or any of the other foods served.

The positive throat cultures from the 3 food handlers at the restaurateur's taken on February 11, 1957, 5 days after the luncheon, could be explained by the assumption that each of these men sampled the egg salad during and after mixing. Investigation of this possibility revealed that two of the food handlers tasted some of the egg salad; the third could not be reached. Consequently, the question again arises whether these positive throat cultures are cause or effect.

Conclusions from the failure to find evidence of nephritis in 97 subjects must be guarded. A single urine specimen is not wholly adequate to rule out this condition, even when taken at approximately the time when nephritis would be expected to be present. The negative information secured from physicians treating over 300 patients must also be interpreted with caution. We may at least say, however, that the incidence of nephritis, if it occurred, was low. Only two cases of nephritis have been reported in the literature in association with type 25 streptococcus.

Apparently the secondary attack rate for this outbreak was low. Those private physicians who were questioned reported very few cases in other members of the families or the community except among those who ate the food served at the luncheon. Likewise, a review of the causes of absence from the schools in the area showed no marked increase in the number of acute sore throats. One possible explanation for the low secondary attack rate is the fact that many of the private physicians in the area gave routine prophylactic antibiotics to contacts of the primary cases. However, secondary attack rates appear to have been low in other foodborne streptococcal epidemics before antibiotics were used.

Even after taking into account the use of effective antibiotic therapy, the cases in this epidemic were impressively mild as contrasted with those of an earlier era when septic sore throat was attended by a considerable number of suppurative complications and a substantial mortality. This is consistent with the long-time trend toward reduced clinical severity of scarlet fever and, presumably, respiratory streptococcal infections.

Summary

In February 1957 a foodborne outbreak of streptococcal sore throat, estimated to have caused over 500 illnesses, occurred in Baltimore, Md. The attack rate was 70 percent among the 86 persons studied. The causative organism was a group A, type 25, beta hemolytic streptococcus.

Epidemiological investigation suggests that egg salad served at a luncheon was the vehicle, 83 percent of those who ate the food reporting illness. The source of the infection was not ascertained.

Although the search for nephritic complications was limited, no evidence was found to support reports of the nephrotoxic potential of this streptococcal type.

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The Biophysical Society

The first national meeting of the Biophysical Society was held at the Massachusetts Institute of Technology in Cambridge, Mass., during February 5-7, 1958.

Founded in March 1957 in Columbus, Ohio, the society has defined its aim as the promotion of "a more complete biological science with emphasis on mathematically formalized theory and quantitative experimentation." The group hopes to achieve this goal by welding into a new scientific team experts from such fields as physics, biology, medicine, chemistry, mathematics, and engineering.

Intensively studied at the 1958 meeting were aspects of molecular biophysics, particularly microsomal particles and protein synthesis, and muscle proteins and contractile mechanisms. Papers were presented by specialists drawn from the United States and abroad with the assistance of the National Science Foundation.

TPI and TPCF Tests On 2,000 Patients Difficult to Diagnose

AD HARRIS, VIRGINIA H. FALCONE, B.S., LEWIS S. PRICE, and WILLIAM J. BROWN, M.D.

SINCE January 1, 1955, the Venereal Disease Research Laboratory of the Public Health Service has offered a *Treponema pallidum* immobilization (TPI) testing service on a nationwide basis to all physicians through the laboratories of State and Territorial departments of health. The Venereal Disease Research Laboratory has received from State laboratories requests for TPI testing of approximately 100 serums per week since commencement of the service (1, 2). During a part of this period, the *Treponema pallidum* complement fixation (TPCF) test also was used—experimentally and as a research tool. From July to December 1956, both these procedures were used on all serums submitted for TPI testing, and in January 1957 the TPCF test was made an integral part of the TPI testing service.

All serums submitted for TPI testing have been tested first with the TPCF procedure since January 1957. Only those serums that are not nonreactive in the TPCF test are then tested with the TPI procedure. When both tests are performed, the completed report identifies each test by name and lists the results obtained in each.

This report presents analyses of results obtained with TPI and TPCF tests on 2,000 serums tested during the period from July to December 1956, when all serums were being tested with both procedures, and relates these findings to the patient data and medical opin-

ions submitted with the serums. Serums were received from more than 1,300 physicians in 47 States and Territories, so they probably represent a fair cross section of the diagnostic-problem patients of the average physician. The patients included 1,255 females (62.75 percent) and 745 males (37.25 percent). This percentage distribution by sex is approximately the same as has been noted since the TPI testing service was introduced, and it may indicate that the diagnostic problem in regard to syphilis is occurring approximately twice as often in female as in male patients (3).

Methods

Serums. Specimens submitted for TPI testing service are received from the State and Territorial departments of health laboratories, accompanied by completed clinical data sheets. The clinical data sheet, in addition to identifying the patient, lists blood and spinal fluid test reports, any history of treponematoses and treatment given, history of several conditions or infections known to be associated with biologic false-positive (BFP) reactions, and finally, the opinion of the attending physician as to the probable diagnosis of the patient at the time the blood is submitted. The stipulations for the acceptance of specimens for this service are that they be sterile serums from diagnostic-problem patients with no history or clinical evidence of syphilis or with suggestive evidence of untreated syphilis.

TPI Test. The TPI test was performed according to the Nelson technique (4, 5) as modified in later publications by the Venereal Disease Research Laboratory (6-9). Only those serums which, after treatment with penicillinase, produced less than 70 percent motility in the control tube were reported as inconclusive.

TPCF Test. The qualitative TPCF test was performed according to the technique described by Portnoy and Magnuson (10). Antigen was obtained from the Venereal Disease Experimental Laboratory, Chapel Hill, N. C. An anticomplementary report was recorded on those specimens that were anticomplementary in qualitative testing and insufficient in quantity to allow preparation of dilutions for retesting as prescribed in the technique.

Mr. Harris is director, Mrs. Falcone is a bacteriologist, and Mr. Price is administrative officer, Venereal Disease Research Laboratory, Venereal Disease Branch, Communicable Disease Center, Public Health Service, Chamblee, Ga. Dr. Brown is chief of the Venereal Disease Branch, Communicable Disease Center, Atlanta, Ga.

Discussion

Specific test results obtained with the TPI and TPCF tests on 2,000 serums (745 from male patients and 1,255 from female patients) are shown in table 1. Several observations may be made from these data. The TPCF test was slightly more reactive for this donor group than was the TPI test. Although 42.5 percent were reactive to the TPCF, while 47.7 percent were reactive to the TPI test, the reactive plus weakly reactive results totaled 51.0 percent for the TPCF and only 49.8 percent for the TPI test. Conversely, the percentage of nonreactive findings was greater with the TPI test (50 percent) than with the TPCF test (48 percent). The percentage of nonreactive results in both tests was higher for serums from females (TPI 54.4 percent and TPCF 51.2 percent) than for the specimens from males (TPI 42.6 percent and TPCF 42.7 percent). As indicators of probable false-positive reactions in other tests for syphilis, the nonreactive results in these tests suggest that the proportion of probable biologic false-positive reactors is higher in female than in male patients.

Only 20 (1 percent) of the 2,000 serums were reported as anticomplementary in the TPCF test (see "Methods") and only 3 serums (0.2

percent) were reported inconclusive in the TPI test.

Actual agreement between the results obtained with the TPI and TPCF tests is not as great as is indicated by the total percentage of reactive plus weakly reactive results for the two tests. One hundred and one serums (5.0 percent) that were nonreactive in the TPCF test produced reactive or weakly reactive results in the TPI test. One hundred and thirty-one serums (6.5 percent) that produced nonreactive results in the TPI test were either reactive or weakly reactive in the TPCF test. Direct disagreement of results obtained with the two tests was produced, therefore, in 11.5 percent of the 2,000 specimens. Inclusion of anticomplementary and inconclusive findings brings the non-agreement total to 12.7 percent.

Complete serologic agreement of these two tests was obtained in 1,745 (87.3 percent) of the serums in the series. Both tests were reactive or weakly reactive in 887 (44.4 percent), and both were nonreactive in 858 (42.9 percent) of the specimens tested.

Since the TPCF test is now being used as a screening procedure for the TPI testing service, the 101 serums showing nonreactive results in the TPCF test but with some degree of reactiv-

Table 1. Comparative results of TPI and TPCF tests on 2,000 serums

Type of reaction	TPI test									
	Total		Reactive		Weakly reactive		Nonreactive		Inconclusive	
	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent
Both sexes	2,000	100.0	956	47.7	41	2.1	1,000	50.0	3	0.2
Reactive	851	42.5	781	39.0	8	.4	61	3.0	1	.1
Weakly reactive	169	8.5	93	4.6	5	.3	70	3.5	1	.1
Nonreactive	960	48.0	74	3.7	27	1.3	858	42.9	1	.1
Anticomplementary	20	1.0	8	.4	1	.1	11	.6		
Males	745	100.0	417	56.0	10	1.3	317	42.6	1	.1
Reactive	364	48.9	344	46.2	2	.3	18	2.4		
Weakly reactive	56	7.5	37	5.0	1	.1	18	2.4		
Nonreactive	318	42.7	35	4.7	6	.8	276	37.1	1	.1
Anticomplementary	7	.9	1	.1	1	.1	5	.7		
Females	1,255	100.0	539	43.0	31	2.5	683	54.4	2	.1
Reactive	487	38.8	437	34.8	6	.5	43	3.4	1	.1
Weakly reactive	113	9.0	56	4.5	4	.3	52	4.1	1	.1
Nonreactive	642	51.2	39	3.1	21	1.7	582	46.4		
Anticomplementary	13	1.0	7	.6			6	.5		

Table 2. Medical data supplied with 101 serums nonreactive in TPCF and reactive or weakly reactive in TPI tests

Diagnostic category and sex	Total	History of syphilis	No history of syphilis
All diagnostic categories	101	24	77
Males	41	9	32
Females	60	15	45
Syphilis	18	12	6
Males	9	5	4
Females	9	7	2
Biologic false positive	71	9	62
Males	28	3	25
Females	43	6	37
None stated	12	3	9
Males	4	1	3
Females	8	2	6

ity in the TPI test are of most interest. Table 2 shows that these serums were from 18 patients considered to be syphilitic, 71 patients considered to be biologic false-positive reactors, and 12 patients for whom no clinical opinion had been given. The group includes 24 patients with some history of syphilitic infection and 77 patients without positive history or physical findings of infection. Distribution in this group as to sex, history of previous syphilitic infection, and present diagnosis is not unlike

that in the remainder of the 2,000 patients in this study. One significant difference noted of this group, however, was the number of weakly reactive TPI test results. Twenty-five (25 percent) of these 101 serums produced weakly reactive TPI test findings as compared with only 41 (2 percent) of the total 2,000 serums tested.

Seventeen hundred and fifty-four of the serums were accompanied by data sheets indicating the clinical impression of the submitting physician as to whether the patient was a biologic false-positive reactor or had syphilis. Comparisons of test results obtained on specimens in these two categories are presented in tables 3 and 4. No clinical opinion was indicated on the data sheets for the remaining 246 serums.

Of the 1,407 serums from patients listed as probable biologic false-positive reactors (table 3), 47 percent were nonreactive to both the TPI and TPCF tests. Results from either test alone were in slightly closer agreement with the medical opinion that these specimens were from BFP reactors, since 54.3 percent nonreactive results were obtained with the TPI test and 52.0 percent were produced in the TPCF test. Of the 1,407, 40.3 percent were either reactive or weakly reactive in both the TPI and TPCF tests. The group of specimens from females showed closer agreement with medical opinion

Table 3. Comparison of TPI and TPCF test results on 1,407 serums from patients diagnosed biologic false-positive reactors

Type of reaction		TPI Test							
		Total		Reactive or weakly reactive		Nonreactive		Inconclusive	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
TPCF Test	Both sexes	1,407	100.0	643	45.6	762	54.3	2	0.1
	Reactive or weakly reactive	661	47.0	567	40.3	92	6.6	2	.1
	Nonreactive	732	52.0	71	5.0	661	47.0		
	Anticomplementary	14	1.0	5	.3	9	.7		
	Males	492	100.0	268	54.5	224	45.5		
	Reactive or weakly reactive	263	53.5	239	48.6	24	4.9		
	Nonreactive	224	45.5	28	5.7	196	39.8		
	Anticomplementary	5	1.0	1	.2	4	.8		
	Females	915	100.0	375	41.0	538	58.8	2	.2
	Reactive or weakly reactive	398	43.5	328	35.9	68	7.4	2	.2
	Nonreactive	508	55.5	43	4.7	465	50.8		
	Anticomplementary	9	1.0	4	.4	5	.6		

Table 4. Comparison of TPI and TPCF test results on 347 serums from patients diagnosed as syphilitic

Type of reaction	TPI Test							
	Total		Reactive or weakly reactive		Nonreactive		Inconclusive	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Both sexes.....	347	100.0	233	67.2	113	32.5	1	0.3
Reactive or weakly reactive.....	237	68.3	214	61.7	23	6.6		
Nonreactive.....	108	31.1	18	5.2	89	25.6	1	.3
Anticomplementary.....	2	.6	1	.3	1	.3		
Males.....	164	100.0	109	66.5	54	32.9	1	.6
Reactive or weakly reactive.....	110	67.1	100	61.0	10	6.1		
Nonreactive.....	53	32.3	9	5.5	43	26.2	1	.6
Anticomplementary.....	1	.6			1	.6		
Females.....	183	100.0	124	67.7	59	32.3		
Reactive or weakly reactive.....	127	69.4	114	62.3	13	7.1		
Nonreactive.....	55	30.1	9	4.9	46	25.2		
Anticomplementary.....	1	.5	1	.5				

than specimens from males. Nonreactive results were produced by TPI in 58.8 percent, and by TPCF in 55.5 percent of the serums from female donors, whereas each test produced nonreactive results in 45.5 percent of the serums from males. This may reflect some factor, present in the female, that is responsible for an increased percentage of BFP reactions.

Of the 347 specimens from patients currently diagnosed as syphilitic (table 4), 61.7 percent were reactive or weakly reactive in both tests, while 25.6 percent were nonreactive in both tests. Again slightly closer agreement with medical opinion was shown by the results of each test considered independently, since 67.2 percent reactive results were produced in the TPI test and 68.3 percent were obtained in the TPCF test. Here no significant difference between reactivity in either test of serums from male and female donor groups was noted.

Approximately 5 percent of the serums in this study produced TPI reactions (reactive or weakly reactive) and would have been missed if the TPCF nonreactive serums had not been tested further. However, 6.5 percent of the serums were reactive or weakly reactive in the TPCF test and produced nonreactive findings in the TPI test. It is estimated from these bases that the TPCF test, when used as a screening procedure for the TPI test, may detect (in-

cluding anticomplementary findings) approximately 90 percent of the serums that will produce reactive or weakly reactive findings in the TPI test, although a larger total number of reactive plus weakly reactive TPCF test results may be obtained. The percentage of agreement between results obtained with the TPI and TPCF tests reported here would not necessarily be similar to findings produced by testing groups of specimens selected in a different manner.

Summary

Results obtained with the TPI and TPCF tests on 2,000 serums from diagnostic-problem patients were in agreement on 1,745 serums (87.3 percent).

The greater proportion of nonreactive results produced by serums from female patients in both or either of the treponemal tests is an indication that biologic false-positive reactions may be more prevalent among female patients.

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PHS exhibit

The Domestic Migrant Worker

To encourage community effort in meeting the health problems of domestic agricultural migrants on a continuing basis, information is supplied through a Public Health Service exhibit.

The exhibit consists of maps, charts, and photographs, illustrating the major routes traveled, important work areas, typical housing, and health conditions. It gives examples of organized effort in making health services available to the migrants who follow the crops each year. The exhibit is designed for display at national, regional, and State conferences, and in other places where interested people gather together.



Specifications: A 3-panel exhibit on legs, 7 feet high, total weight 377 lbs., including the packing crate; back panel, 4' x 6'; each of the side panels, 4' x 3', attached to the center by hinges. Lighting fixtures fit into each of the panels through slots at the top, and the three 150-watt reflector floodlights can be connected with a single outlet. Available through the Division of General Health Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C.

are we getting public health in tune with the times?

"Be they pessimists or optimists, public health workers everywhere agree that these are times of change and that the future of public health is either beset with or holds promise of unprecedented challenge. Fortunately, there is today a ferment in public health. . . . The frustrations, the disappointments, the dissatisfactions and discontentments are, in my opinion, the precious yeast so essential to constructive ferment. They are basic to the evolution of new knowledge and new understanding which can lead to greater attainment. . . . Although science can show us how to achieve our ends, it is a sobering fact, but a heartwarming and human one, that for motivation and purpose we must seek guidance elsewhere—in faith, in fellowship, in our relationships, and in our public policy pronouncements. It is in guidance in these all-important areas that our Association has the potential for serving us so well."

JOHN W. KNUTSON, D.D.S., Dr.P.H.
President, American Public Health Association
From the presidential address at the
Eighty-fifth annual meeting, November 11, 1957

**SUMMARIES OF SELECTED PAPERS
from the 85th annual meeting
of the
AMERICAN PUBLIC HEALTH ASSOCIATION
and related organizations
held at Cleveland, Ohio
November 11-15, 1957**

The APHA Conference Report



With the assistance and cooperation of the authors, the staff of *Public Health Reports* has summarized some 70 of the papers presented at the 85th annual meeting of the American Public Health Association and related organizations in Cleveland, Ohio, November 11-15, 1957.

Summaries selected for publication in the following pages are intended to present information which may not otherwise have been given adequate notice. Omitted from these selections are papers which were known to have been scheduled for early publication in the *American Journal of Public Health*; papers whose authors provided no copies for this

journal; and papers which, for one reason or another, did not seem suited to summarization.

No papers on laboratory methods are summarized here because of the understanding that they would have early publication, at least in brief form, in the APHA journal.

Other papers presented at the conference are under consideration for publication in subsequent issues of *Public Health Reports*. The February issue carried papers given at the meeting of the health officers section with the American College of Preventive Medicine.

Names of sections and some of the affiliated organizations represented at the conference are listed below.

Sections of the American Public Health Association

Dental Health
Engineering and Sanitation
Epidemiology
Food and Nutrition
Health Officers

Laboratory
Maternal and Child Health
Medical Care
Mental Health

Occupational Health
Public Health Education
Public Health Nursing
School Health
Statistics

Related Organizations Participating in the Conference

Associations

American Association of Hospital Consultants
American Association of Public Health Physicians
American Association of Registration Executives
American Industrial Hygiene Association
American School Health Association
American Society of Professional Biologists

Association of Business Management in Public Health
Association of Labor Health Administrators
Association of State Maternal and Child Health and Crippled Children's Directors
Association of Teachers of Preventive Medicine
Industrial Medical Association
Public Health Cancer Association

Conferences

Municipal Nurse Directors

Municipal Public Health Engineers
Public Health Veterinarians
State and Provincial Public Health Laboratory Directors
State Sanitary Engineers

Other

American College of Preventive Medicine
The Biometrics Society (Eastern North American Region)
National Citizens Committee for the World Health Organization

Current Needs . . .

Effective Health Department Uses Community Resources

Observing that health officers generally consider the community or the political subdivision they serve as their patient, Dr. Ellis D. Sox, director of public health for the city and county of San Francisco, touched briefly on current administrative needs.

Most important, said Sox, we must remove from our thinking the effects of "ancestor worship" and make administration a moving and changing force toward the solution of public health problems of every community, every State, and the Nation.

Motivation of the patient—the community, that is—to accept recommended treatment and the ability of the health officer as administrator to use all necessary resources in the most effective and efficient manner possible are two other important factors, according to Sox. He believes that the health officer must use more and more of the skills currently used by private industry and business in order to make his official activities effective.

In creating recognition among the public of needs for corrective action, the health officer must adopt the techniques of modern communications, he advised. To achieve recognition and correction of such public health problems as poor mental health, alcoholism, and suicides, he must use also the information and know-how available from specialists in sociology, cultural anthropology, and economics.

Sox advocated the substitution of an authoritative approach for an authoritarian approach "so that the health officer may more effectively cooperate with law enforcement agencies, traffic enforcement agencies, urban renewal agencies, planning commissions, and rehabilitation and employment services."

This approach is not strictly that of the scientist, unless it be the social scientist, he said.

Conflict of Interests Demands New Approach

Unlike the communicable diseases, many modern public health problems raise a conflict between protection of the public health on the one hand and the uses of modern technology on the other, or, what is even more complex, a conflict among various public health interests, according to Frank M. Stead, chief of the division of environmental sanitation, California State Department of Public Health.

In the first category he listed medical, research, and industrial uses of nuclear energy; insecticides "so powerful that a few ounces are capable of killing all the insects in an acre of land"; and air pollution, particularly smog, the byproduct of petroleum when it is burned as fuel.

As an example of the second type Stead mentioned the various uses of water. "Outdoor recreation on water is a public health asset," he observed, "yet at the same time recreational use of water supply reservoirs runs counter to the classical principle of giving the highest possible protection to domestic water supplies. Reclamation of sewage to conserve both water and organic material could greatly reduce the pollutional load on streams and salt water recreational areas, but the re-use of such water and organic material carries with it public health risks. . . ."

Modern hazards cannot always be attacked as unmixed evils, Stead emphasized.

The solution lies in the highest possible degree of reconciliation of opposing interests, if they are valuable to society, asserted Stead.

It has been a reasonable policy to seek eradication of communicable

diseases, such as smallpox, plague, typhoid fever, malaria, and syphilis. But the practical value of radiation, insecticides, or materials causing atmospheric pollution is such that it is not wise to seek complete eradication of these hazards if that were possible. The end to be sought, he said, is control, rather than absolute protection. As a result, public health agencies today are deeply engaged in complex evaluation and planning.

Population Increases, Shifts Dictate New Activities

Implications of population changes, such as the increase in the oldest and youngest age groups, the geographic irregularity of the increases, and the rural-urban shifts, were discussed by Dr. John J. Hanlon, director of public health services of the city of Philadelphia and chairman of the department of preventive medicine and public health, Temple University School of Medicine.

These changes, he said, have occurred "with dramatic suddenness and with all the subtlety of a sledge hammer." Hanlon mentioned as outstanding for public health consideration the following items, none of them new, he said, but all deserving emphasis.

- The vast swarm of children appearing demands reevaluation, revamping, and extension of a number of activities, such as the well-child clinics and school health education.

- The growing number and proportion of individuals of advanced age dictates a change in thoughts and activities and development of truly fruitful services and facilities for this group. Above all, it is necessary to discard the idea that senility, infirmity, and incapacitation are synonymous with aging.

- The shrinking size of the middle age groups, the most productive social component, and the growing disparity between men and women in length of life suggest specific,

concerted attention to the wage-earning male.

All of these and other problems, Hanlon asserted, emphasize the need for serious effort to improve the quantity, quality, and distribution of personnel and facilities required to serve these needs.

For public health and medical training, Hanlon suggested that the cost of schools be shared through support not only by the Federal and State governments but also more and more by industry. He believes such sharing is fully justified, first, because the schools actually serve regional, national, and, indeed, international interests; second, because of the increased range of movement of the population; and third, because the schools serve what is now essentially an industrial culture.

With these and other factors in mind, Philadelphia is currently experimenting with standards and formulas for more exactly determining and measuring needs and priorities, Hanlon reported.

Community Organization, Key to Health Progress

Effective community organization is a key to progress in community health, according to views expressed by Sewall Milliken, department of public health, Yale University.

Starting with the premise that the "most crucial problem today is the ever-widening cultural lag between scientific health knowledge and the application of this knowledge by communities," Milliken emphasized community organization as a corrective method.

The three main ingredients in community health progress are research, education, and service, he said, explaining that keeping these three properly related is the job of community organization.

Milliken pointed out further that community health groups are usually coordinated by one or more professional health groups or voluntary or official agencies who have initiative.

As examples of sound community organization, Milliken mentioned the Cincinnati Health Federation, the Cleveland Health Council, and the Metropolitan Health Council of Columbus, three of the oldest community health councils. Such councils provide the setting and the opportunity for professional groups, voluntary and official agencies, and hospitals and other institutions to participate in cooperative health evaluation and planning, he said.

There is great need, according to Milliken, to inject this health council experience into curriculums and training courses to prepare individuals for specialized executive, administrative, and educational work.

Too often in the past, health programs have been established on the basis of personal opinion or hasty observation, he noted. In too many communities no money is set aside for fact finding and for systematic evaluation of future needs and developments.

Milliken believes that communities must devote time and money to fact finding and to studies of health needs and resources. The many demographic changes alone necessitate such action, he contended.

States and Localities Lag in Research

State and local health departments are not contributing adequately to progress in public health through research, contended Dr. Albert V. Hardy, director of the bureau of laboratories, Florida State Board of Health.

Few State or local health departments are approaching today's needs in the spirit of investigation that brought success in the control of communicable diseases, he said. In contrast to the activities of those concerned with the individual patient, Hardy observed little vigor in public health research by State and local health departments, which are experienced in the study of populations and which have ready access

to communities. The result is a lack of adequate evidence to develop a distinctive public health approach to modern conditions.

Hardy pointed out that the Federal Government supports public health research through grants administered by the Public Health Service.

"Public health workers, accustomed to categorical grants and unfamiliar with the exacting methods prescribed by law for the review of research grant requests, have been slow to seek supplementary support from this source," he said.

To substantiate this statement, he gave the following figures: In the years 1951-56, of 15,342 research grants totaling almost \$162 million only 66 (0.6 percent) amounting to about \$1½ million (0.8 percent) went to State and local health departments.

This lack of participation was the result, not of a low approval rate, but of a low request rate, Hardy maintained.

Research in the new fields of public health needs to be accepted on the same terms as epidemiological investigation of communicable diseases, he declared.

Hardy noted that the Association of State and Territorial Health Officers recommended in 1955 that health departments assign responsibility for research planning to a person or a committee.

Florida, he reported, has designated a State coordinator of research and plans establishment of divisions of research and program development in a number of local health departments. The first is in the Dade County Health Department.

Social Scientist Itemizes Felt Health Needs

Health needs recognized by the public were identified and described by Donald G. Hay, a social science analyst of the U. S. Department of Agriculture.

Public awareness of existing local

HEALTH CARE NEEDS

health services, he observed, is rooted in their involvement in such services.

From the results of several public opinion surveys, most of them conducted in rural areas by land grant colleges or the U. S. Department of Agriculture, Hay listed the following as needs recognized by the public (see table also):

- Additional health care personnel and facilities, particularly physicians.
- More effective organization of health care resources: better spatial distribution of services, willingness of physicians to make house or night calls, expansion of home nursing services, reduction in waiting time in the physician's office, and more effective communication between physician and patient.
- Improved environmental health.
- Greater emphasis on preventive health care.
- Further development of voluntary health insurance.

With regard to health insurance, the studies revealed a felt need for more consumer education on both "the financial protection available

and how such a financing mechanism serves to make the rapid advances of health care available to people," Hay said.

From similar studies, Hay reported the following observations concerning the public's knowledge of existing public health services:

- About three-fourths or more of the households know about their local health department.
- From one-twentieth to one-third do not know of any services provided by their local health department.
- The services most frequently reported as "important" are vaccination and immunization, chest X-rays, sanitation services, and maternal and child health services.
- Usually more people indicate that they have used services available in local health departments than report having used the department.

"Improved two-way communication between the public and the health agencies and continuing efforts to step up active participation by the people in planning and developing programs," were Hay's concluding recommendations.

Suggests Functional Study For Nurse Recruitment

Study of functions and services is one approach to the recruitment problem in the Philadelphia Department of Public Health's division of public health nursing, according to Madelyn N. Hall, director of the division.

Believing that application of all available scientific knowledge to the problem might produce solutions, Hall emphasized the need to do more than look for "as many seeds as one can find." The kind of seeds, the fertility and nourishment of the soil, and the planting methods will determine the recruitment yield, she said.

Characteristic functions of the public health nurse include health teaching, health counseling, epidemiological investigation, and interdisciplinary planning, as well as the practice of nursing techniques.

Time and activity studies, Hall reported, revealed that this academic definition of function was being applied only to a limited extent. As a result of the studies, a

Summary of health care needs recognized by the public ¹

Survey area and date	Number of households reporting	Percent of households expressing need for—					
		More physicians	More dentists	More hospitals or clinics	Improved environmental health	More preventive care services	Other needs
<i>Rural</i>							
Six nonmetropolitan counties, New York, 1949-51	1, 490	41	20	44	² 17	² 16	² 2
Two Piedmont counties, North Carolina, 1956	611	60	31	(³)	10	2	5
Perry County, Ark., 1955	1, 352	93	86	25	16	2	3
Rural county, Kentucky, 1948	122	88	(³)	62	10	9	9
Rural areas, Michigan, 1948	319	59	(³)	(³)	6	2	(³)
Rural areas, Washington, 1947	595	55	13	54	(³)	(³)	(³)
<i>Urban</i>							
Mecklenburg County, N. C., 1952	500	53	36	77	(³)	(³)	(³)
Lucas County, Ohio, 1951	590	30	(³)	(³)	(³)	3	12
Urban areas, Michigan, 1948	296	52	(³)	(³)	6	2	(³)

¹ Based on results of surveys by various groups.

² 1,478 households reporting.

³ Not ascertained.

number of questions had to be answered and a number of steps had to be taken.

The first question concerned service: What are the service responsibilities of the official agency and what are those of the voluntary agency?

Hall termed the traditional view of these responsibilities provincial. Responsibilities have been defined on the basis of the source of income rather than on the basis of the indivisibility of public health practice, she maintained. Responsibilities have been agreed upon to prevent duplication of service rather than to provide an integrated service.

As an illustration of how it should be, she cited Philadelphia's approach to the impending onslaught of Asian influenza. Representatives of six voluntary and official agencies and two professional organizations developed a plan of coverage for the city, she said. All nursing resources are pooled, and supervision is provided by qualified personnel of any one of the participating agencies.

Integration of services, however, is not the complete answer, she observed, listing the following additional questions: What services should be provided? How complete a population coverage can one expect? How do we deal with the major types of changes which are going on in the modern world?

Barriers to answering these questions include mandates from public officials who control the purse strings, vocal community pressures and lack of agreement by medical personnel immersed in their own specialties.

Hall considers the factor of services crucial. How can one know what staff to look for if one is not certain of the kinds and extent of services? she asked.

However, with only partial knowledge of these matters, perhaps the problem can be tackled from the standpoint of characteristic functions, she suggested. She mentioned improvements in training of public health nurses realized through this approach.

Disability Pension Called Obstacle to Rehabilitation

The pension, when its continuation is dependent on proof of disability, is a primary obstacle to rehabilitation, asserted Dr. Dean W. Roberts, executive director, National Society for Crippled Children and Adults.

The worker who incurs a severe disability has had an experience that may shake his confidence in himself and in the world in which he lives, Roberts explained. He faces the alternative of fighting a difficult and at times discouraging battle to overcome his disability and regain independence or of withdrawing into the protection of dependency with its shattering effect on human personality and dignity.

"Some argue," he continued, "that the disability pension provides a secure economic base from which the disabled person can work toward rehabilitation. Others, however, and many experts in rehabilitation among them, hold that as long as a man's bread-and-butter income hinges on his maintaining proof that he is totally disabled, only the rare individual will . . . turn his back on the small but secure pension and fight for economic independence in a competitive society."

Considering the current status of rehabilitation efforts, Roberts observed that rehabilitation techniques are being applied relatively effectively to children and to adults with a vocational objective, but not to the severely disabled who have no vocational objective. The aged disabled in particular are being neglected, he said.

Roberts considers this situation a direct reflection of State and Federal laws, which in turn reflect the attitudes of the public.

The severely handicapped who are beyond the reach of substantial rehabilitation could achieve a large degree of self-care if the proper services were available, he argued. Such a program would be justified not only from a humanitarian standpoint but also because it would reduce the large burden of custodial care and would free professional personnel now tied down with such care.

The time has come, he declared, when the philosophy and practice of rehabilitation must be applied by all physicians and in all hospitals and nursing homes rather than by a few specialists working in a few centers.

Additional areas for improving rehabilitation work are motivation of the patient and coordination of services, according to Roberts.

School Health . . .

How Health Teaching Gains Status and Support

Health teaching often lacks status and public support, although no other area of the school curriculum, except American history and citizenship, has received more legislative backing, asserted Dr. Bernice R. Moss.

Moss, public health adviser, Program Development Branch, Division

of General Health Services, Public Health Service, pointed out that laws in many States require the teaching of hygiene, sanitation, disease control, and the effects of alcohol and narcotics.

Within the school, however, health teaching is often a stepchild; it lacks the academic tradition of other subjects and is often confused with physical education, first aid, driver training, or family life

HEALTH TEACHING

courses. Perhaps health education lost some of its academic status when the term replaced the older ones, hygiene and physiology, stated Moss.

She outlined how health teaching can gain status and public support to become a potent force, enriching the lives of children and improving the community.

Health education flourishes in schools where an administrator, convinced that it is essential to the curriculum, provides for academic credit, classrooms, teaching materials, and above all, a trained teacher.

Ultimately the worth of health teaching in both elementary and secondary schools rests with the trained teacher, Moss stated.

Ideally, the elementary teacher is a generalist who includes health education in her total teaching assignment, who is aware of children's health needs and interests, and who motivates behavior in accordance with acceptable biological and social patterns.

The secondary school teacher treats health education as an applied science. She draws from the physical, biological, and social sciences the concepts important to human survival, development, and adjustment. Not just anyone can teach health, Moss declared. Skill in instilling these concepts in adolescents demands training and insight.

Where administrative support is coupled with teaching competence, health education achieves status in the students' minds and through them, in the community. The youth whose behavior is improved, whose intellectual curiosity is aroused, pleases his parents. He is the best argument for health teaching, and he builds understanding and support for it.

Community Interest

Where schools do little health teaching, someone or some group may bring about a change. The parent-teacher association, the county medical society's school

health committee, the community health or welfare council, or some influential citizen can request information about health teaching from the school superintendent or principal. Interest in improving health teaching and the willingness of a community group to work with the schools can lead to constructive changes.

The public school curriculum is responsive to the will of the people, stated Moss. But care must be taken to emphasize the broad health needs of the child and the community. Piecemeal education can result from a group's pressure tactics or insistence that a particular topic be added to the curriculum.

People must understand that no magic formula will protect life and promote health, Moss asserted. The health concepts and behavior of a people grow from their culture, and children reflect their parents' attitudes and beliefs. With enlightened public support teaching can be changed. Status will accrue to health education as it proves itself in the lives of children and the improved health of the community.

Mental Health Programs In Schools Evaluated

Mental health programs in the elementary and secondary schools urgently need an appraisal of their results, clarification of the anxiety factor in growth and motivation, and closer cooperation between behavioral science specialists and teachers, according to Dr. John I. Nurnberger, chairman, department of psychiatry, and director, Institute of Psychiatric

Research, Indiana University Medical Center. He ascertained these needs by scrutinizing current practices in educational mental hygiene.

Appraisal Needed

Merely stating that the mentally healthy student is an educational goal is not enough. A skeptical appraisal of present practices to test their basic hypotheses is needed, Nurnberger stated. He questioned whether students participating in group discussions, counseling experiences, and other mental health activities really become more stable, creative, productive, and conscientious persons.

After 15 years' emphasis on children's social, cultural, and emotional needs, is today's youth more anxiety-free and emotionally stable? Why has there been no substantial decrease in the incidence of juvenile and young adult social deviants? Nurnberger questioned.

He pointed out that the information for assaying the mental health of any segment of the school population has not yet been collected and that such information may amplify and correct present mental health criteria. School mental health projects as reviewed in 1951 by the Committee on Preventive Psychiatry of the Group for the Advancement of Psychiatry have, as a common goal, improvement of the child's emotional maturation to enable him to function effectively.

The teacher's attitude is vitally important in this process. She must be tolerant and permissive so that the student can readily accept and appreciate behavior and its determinants in himself and his peers. The teacher-pupil relationship should de-

Bold Approach

If we continue merely the routine activities of the past, the health officer will be merely a cog in an essential but undistinguished administrative machine; only with a bold approach to meet the new demands of the time shall we earn the sense of real achievement which comes to the pioneer.—C.-E. A. WINSLOW.

velop a more tolerant superego, according to the committee report.

The more tolerant the superego becomes, it is asserted, the more insight into motivational factors is developed, and the greater the resultant relief from anxiety. Thus the student ego will be strengthened, it is reasoned, and the child should enjoy a greater degree of adaptability.

But Nurnberger questioned whether maximal freedom from anxiety is necessary and desirable for student maturation, and whether the student so prepared actually becomes stable, productive, or socially responsible.

If the answer to these questions is yes, it then follows, Nurnberger maintained, that emotional maturation and ambitious aspirations prosper without anxiety. He questioned the proposition that personal standards of behavior should be leveled to bring a student closer to his peers.

He also asked whether such leveling of standards was worth while if its aim was to alleviate anxiety.

American culture may have developed as aggressively and productively as it has partly because restrictive behavior standards forced people to sublimate their sexual, aggressive, and hostile urges, Nurnberger stated.

Observing a great difference between applying knowledge toward the better understanding of others and applying the same knowledge toward control or complacent acceptance of self, Nurnberger questioned school mental hygiene programs which casually substitute common custom for more exacting models of individual behavior.

Teacher's Function

Nurnberger discussed other issues, centering on the teacher, in school mental health. The ideal teacher is an emotionally mature, secure person who can provide understanding while still representing the real demands of social and personal behavior. The teacher in today's society finds it hard to maintain self-esteem and pride in her work, he pointed out.

The behavioral science specialists' responsibility is not only to work closely and consistently with student teachers but to support those engaged in prophylactic group instruction, Nurnberger urged.

Where recognized neurotic or deviant interactions between teacher and student may develop, the social scientists are yet woefully ineffectual, he declared.

Only by cooperative effort can the highly complicated discriminations that determine success or failure in school mental health programs be delineated. Critical followup appraisal of student adjustments to life may develop a better understanding of what mental health really is and how to attain it, Nurnberger predicted.

Psychiatric Services Placed in Schools

Social work in schools thrives best when the psychiatric clinic is within the school, observed Dr. Oscar B. Markey, chief of psychiatry, Mount Sinai Hospital, and consulting psychiatrist in the public schools, Cleveland, Ohio.

This conclusion derives from the basic importance of the group approach to correction of maladjustment, and from the fact that the school offers the most important proving ground for the growth of personality after the pattern has been established in the child's home. Markey also felt that with a clinic in the school it is easier to stimulate a psychiatric attitude among teachers through workshops, case demonstrations, and treatment.

The responsibility of schools for the emotional and social education of the child is inescapable, he said, since emotional history is frequently associated with academic progress or failure, whether as a consequence of normal growth or morbid reactions. The academic experience itself is productive of certain emotional conflicts.

Markey suggested that professional school facilities should intensify their psychological, medical, audiovisual, and guidance services. He also suggested that if the psychiatric clinic cannot be located within the school, psychiatry and its allied disciplines should serve schools through community facilities or by means of psychiatric consultation.

Whatever efforts are undertaken, Markey concluded, the principal of the school remains the key figure, and the teacher is of first importance in the direct application of these efforts.

Voluntary Organizations Aid School Health

"Today's broadly conceived school health program cannot be isolated within the walls of the school and apart from the child's family and community life," asserted Dr. Ralph H. Boatman, director of health education, Tuberculosis Institute of Chicago and Cook County, Ill.

These walls are more easily breached, Boatman said, if the resources of voluntary organizations which are willing to provide staff time and funds to increase child health are properly utilized.

Boatman singled out the contributions of the National Congress of Parents and Teachers, and their local PTA units, to child health. They have sought, in cooperation with other voluntary organizations and government agencies, to make child health a family matter. They have recommended that school health activities be a continuation of earlier, familial experiences. If their suggestions are accepted, Boatman said, family physicians, parents, and teachers will plan sound health measures for the home, school, and community as a unit.

Efforts of the PTA in the past, Boatman pointed out, have resulted in improved community health through fluoridation of water, safety measures, and tuberculosis surveys.

Despite the PTA's willingness to co-operate on matters concerning child health, many school administrators and teachers have failed to appreciate the value of this resource, Boatman said.

Boatman described several instances where voluntary organizations, in cooperation with school and college officials, have provided information, professional knowledge, and skills to promote health. He also pointed out that these organizations have helped recruit health workers and have served as field training or observation centers for college and university students who are working on community health problems.

Voluntary organizations, he went on to say, have aided school health through research and the demonstration of new ideas. The nurse's affiliation with public schools had its beginnings in a voluntary organization's demonstration project, he said.

Voluntary organizations have also contributed to school health, Boatman added, by supporting desirable legislation, and by interpreting school programs, problems, and needs to the community.

How Schools Can Help The Disturbed Child

The school can help emotionally disturbed children in many ways, stated Dr. Harriett B. Randall, assistant medical director, Los Angeles City Board of Education. As essentials of school-provided help, she listed a healthful environment, intelligent intramural and extramural guidance, and stable teachers.

A punishing, rejecting teacher cannot help a distressed pupil or may not even be aware of his emotional distress, Randall asserted. The teacher must be able to detect the emotionally disturbed among children who are noisy and aggressive, or isolated and too conforming, or defiant and destructive. She must also recognize normal personality variations.

A teacher uncertain about a child's adjustment should have help from the school principal, parent, counselor, school nurse, doctor, and others skilled in child understanding, Randall stated.

Remedies

Once the disturbed child is recognized, a parent interview, a good physical examination, and psychometric tests are the first steps. These may indicate a remedy ranging from providing for a hot breakfast or lunch, a rest period, or new clothes, to obtaining glasses, a hearing aid, or treatment for anemia, petit mal, or parasites.

Randall cited the case conference, where all those working with a child pool their information and plan how the school can help him, as a productive technique.

The conference covers the child's school and health records; reports from the school nurse or doctor of examination findings, home visits, hospital and clinical findings, parent conferences, and classroom visits; from the counselor's psychological case study and psychometric tests; from the child welfare and attendance supervisor of home calls; from the teacher of observations and test results; and reports from the guidance clinic and school principal.

Arrangements to help the child adjust, Randall suggested, may be a short school day, remedial classes, a social adjustment transfer to give him a new start with new people, an appropriate transfer of a limited child to a school for the mentally retarded or for those with severe physical defects, or a short exclusion from school. However, all children cannot be helped in school; other pupils cannot be deprived because of extraordinary effort to aid the unadjusted child.

Study of Referrals

Randall discussed other procedures the Los Angeles school system uses. A difficult or urgent decision about a pupil is often referred by the local school to the health branch's central administrative office. Parents and teachers accept a central office deci-

sion more readily, and often the examiner is better prepared to aid the pupil.

A study reported by Randall of a random sample of 50 such special referrals during the past 5 years to the central office show that 30 of the students were boys and 20 were girls, and that their age spread was from 5 to 16 years. Fewest referrals were of 5-, 6-, and 8-year-olds (2 each), and the greatest were of 13-year-olds (8 referrals compared with 3 for 12-year-olds and 4 for 14-year-olds).

Only 19 children had parents currently living together; 17 lived with mothers; 2 with fathers; 1 with mother and stepfather; 1 in a foster home; 1 with mother, father unknown; and 1 with mother, father in a mental hospital. No data were available on the parents of eight children.

Thirty-three had marked or severe emotional instability; eight showed severe behavior disorders; and the others were psychotic or showed marked anxiety, apathy, or school phobia.

The study revealed that the most referrals were for aggressive behavior (20 boys, 8 girls); 8 (6 girls, 2 boys) were for withdrawal characteristics; and 14 for other types of behavior.

Exclusion from school for varying lengths of time was recommended for 36 of the children; 14 returned to school part time or on trial, but only 1 of them adjusted satisfactorily in the referring school.

Guidance Clinic

Randall described the school guidance clinic as another means of helping children. Los Angeles schools and the parent-teacher association jointly maintain a school guidance center and three branch clinics, headed by a chief psychiatrist and staffed with child psychiatrists, psychiatric social workers, and clinical psychologists.

The clinics treat children with school adjustment difficulties and offer diagnostic services and brief therapy. They work closely with the re-

ferral school as well as with the educational staff through inservice training. The guidance clinics are valuable in helping children to adjust, Randall stated.

Throughout the school system are people who help children with emotional problems. To assist a child, all staff members have a responsibility to work as a team, without reduplication and lost effort. Prompt, efficient work will detect abnormal behavior early. Frequently aid is available within the school system, Randall declared.

Research Needed To End School Predicament

Research to determine what is presently being accomplished in school health's foremost need, declared Dr. Leona Baumgartner, commissioner of health, New York City Department of Health.

After recalling the history of APHA's school health section, she turned to future prospects in this field of service.

School health faces a peculiar predicament, according to Baumgartner. By 1975, the 5- to 17-year-olds will number 57 million, almost double the 1950 figure, if levels of fertility remain constant. Present shortages of all kinds of health personnel will be enormously magnified in the future. And there is now no real information as to what school health services actually accomplish.

These factors will make it ever more difficult to attract funds and workers, Baumgartner pointed out. Cost figures are difficult to determine, but more than \$58 million has been spent by schools in 40 States. School health personnel should be able to advise how to spend this sum, she said.

Research Needed

Baumgartner proposed greatly expanded research which can stand up to rigid scientific standards. This would include basic research on children's growth and development;

clinical research on the prevention of disease and disability and on early diagnosis and treatment for those afflicted; and broad scale, operational research of existing school health services.

She posed these questions: Are current methods in health education producing generations who live more healthfully than those in the past? What makes young people and their parents seek health?

What is the classroom's social and emotional climate? Can it be measured? Has it been examined closely enough?

Are medical and paramedical people finding and correcting a larger proportion of defects than 10 years ago? If so, have school health or other community health forces done this, and how has it been accomplished? Are there figures to compare one community's results with another's?

What type of studies of school activities has been most productive? What criteria have been developed to

test the effectiveness of school health programs? Are research workers being trained to do this job?

Cites Critique

Baumgartner cited a critique of school health services which analyzes past studies and suggests future investigations (*School Health Services: A Selective Review of Evaluative Studies*, by Bronson Price, Children's Bureau Document No. 362, January 1958).

She urged academic leaders, practitioners, and those who finance school health to give research top priority in the next decade.

School health personnel need to know if effort and scarce professional talent are being wasted. They can then abandon unfruitful procedures for practices which demonstrably improve the physical, social, and emotional health of school children.

"We dare not go on as we are now—asking for more and more of the same kind of service," Baumgartner declared.

Food and Dief . . .

Immune Milk May Give Protection to Humans

Human beings can acquire considerable passive immunity to disease by drinking milk from cows whose mammary glands have been stimulated to secrete specific antibodies.

Dr. Berry Campbell, associate professor of anatomy, and Dr. William E. Petersen, professor of dairy science, University of Minnesota, have demonstrated that adult humans can absorb a low percentage of antibodies from milk of very high titer.

Earlier experimenters failed to show that antibodies could be absorbed from milk because they had used milk of low titer and expected a high percentage of absorption, Campbell and Petersen said.

The remarkable ability of the cow's udder to produce antibodies was utilized to obtain immune milk. Vaccine injected directly into the teat canal, rather than intramuscularly or subcutaneously, resulted in milk with the highest antibody content.

Milk, like blood serum, contains a globulin fraction rich in specific antibodies. The mammary gland, with its large amount of lymphoid tissue, secretes milk's immune globulins. The spectrum of immunity in the milk corresponds to the cow's immunological history and serves as the early immunizing agent for the calf.

Immune milk is not a new subject, Campbell and Petersen pointed out. Sixty years ago Paul Ehrlich analyzed the transmission of protective antibodies through milk; his associate, Emil von Behring, believed that

IMMUNE MILK

immune milk could control human tuberculosis.

In the last 20 years it has been shown that milk antibodies are similar, if not identical, to serum antibodies. The authors demonstrated in 1950 that antibodies of colostrum and milk were manufactured in the mammary gland. This finding led them to try direct immunization of the gland to produce milk high enough in titer to be absorbed by human beings.

Absorption

Absorption of antibodies from immune milk was observed in both animals and human beings. Mice, tested for the milk globulin's protection against *Salmonella pullorum* infection, showed approximately 10 percent efficiency of absorption. Five milligrams by mouth equaled the protection of 500 micrograms given subcutaneously.

For this test, globulins were isolated from the milk of cows specifically immunized with this organism. Protective properties were quantitated by administration to experimentally infected mice. The prolonged life of the experimental animals over that of the controls indicated effective passive immunity. Fifty micrograms of immune globulins per mouse provided protection in massive experimental infection, and 5-microgram doses gave perceptible protection.

In human beings the authors also observed an uptake of immunity. For example, a man drank a liter of milk per day from a cow immunized with polyvalent streptococcus type A vaccine. The milk's titer was 1:1,000 dilution in a plate agglutination test. In 5 days the man's serum, previously negative, showed agglutinating antibodies, which increased to a plateau of 1:56 by the 19th day.

In other trials made with pollen antigens during the winter months, the skin tests of highly sensitive people changed from positive to negative after they drank milk containing blocking antibodies to ragweed pollinosis.

Some were kept free of all symp-

toms during the entire pollen season. In another experiment, 36 people received statistically significant protection over their controls by drinking a pint of immunized, powdered milk per day.

Implications

Pending large-scale field trials of immune milk, the authors have anticipated some of the implications.

A useful immune milk should be polyvalent, and in recent experiments they found that multiple immunization of cows was possible. One antigen did not interfere with another in milk from cows immunized with 21 strains of human enteric pathogens of *Salmonella*, *Shigella*, and *Escherichia*. Studies using a single packet of 11 antigens of bovine diseases had similar results. High titers to each species were obtained.

Injecting udders with antigens did not lower milk production in regular, high-grade commercial herds already immunized. Immunizing cows would, however, increase production costs. The manipulation involved requires a skill equal to the technique of artificial insemination, according to the authors.

They found that the temperatures necessary for pasteurization and for preparing powdered milk interfered little with antibody activity despite the heat lability of milk globulins. The heat needed to process canned milk, however, caused problems. Milk specifically immunized does not differ in taste, consistency, or chemical composition from ordinary milk.

Immune milk may lead to reevaluating the protein fraction of this food, they said. Breeding of cows and marketing and grading of milk have long concentrated on butterfat content and disregarded other constituents. The protein fraction will acquire a new importance if milk is used for protection against disease.

The potential of scientifically immunized milk has many implications for public health, Campbell and Petersen explained. Nutrition gains a new dimension beyond its present goal of maintaining energy balance

and health. And understanding how mammals protect their young from disease through milkborne antibodies may yield new techniques to battle illness.

Food Additives Pose Continuing Problems

Chemicals and antibiotics in food today confront those administering food and drug laws with many problems. Robert S. Roe, director of the Bureau of Biological and Physical Sciences, Food and Drug Administration, pointed out some current problems and showed how present legislation deals with them.

In the last 15 years science and technology have created new organic compounds, new drugs, new manufacturing processes, and new packaging. And the stabilizers, preservatives, antioxidants, tenderizers, emulsifiers, sweeteners, colors, flavorings, growth promoters, and residues of fungicides, insecticides, defoliants, and herbicides that find their way into the food supply seem limitless, Roe declared.

The Pesticide Amendment to the Food, Drug, and Cosmetic Act, passed 3 years ago, regulates one type of food additive. It provides for establishing safe tolerances for residues of pesticides in raw agricultural products. Administering the law has revealed many difficulties. But the statute is workable and has resulted in several hundred tolerances on various products, stated Roe.

Colors and Poisons

Coal-tar color additives are governed by special provisions of the law. The statute authorizes the listing of coal-tar colors that are harmless and suitable for use in food and for certification of batches of such colors. Under this provision 18 colors were listed as harmless and suitable for use.

However, the application of newer techniques in pharmacology and more complete information on

the chemistry of these dyes have caused 3 colors to be delisted in 1956, and delisting procedures for 4 others are under way. An amendment to the law, recently introduced in Congress, would relax the present harmlessness rule and replace it with authorization to establish safe tolerances for coal-tar colors.

The Food, Drug, and Cosmetic Act also prohibits adding any poisonous or deleterious substance to food unless the addition is required in production or cannot be avoided in good manufacturing practice. If the addition is necessary or unavoidable, then safe tolerances may be established.

But this provision fails on two counts to solve the problems of chemical additives, Roe said. First, the poisonous or deleterious properties of many substances may not be known, and to prevent their use, the Government must be able to show affirmatively that the additive in question is poisonous.

Second, some additives, while not necessary, may be desirable to improve nutritive values, preserve color or flavor, or serve purposes useful to the consumer. The law, however, permits no additive unless it is necessary.

Misuse of antibiotics in treating animals may also affect food derived from these animals. For example, penicillin used to treat cows for mastitis has appeared in their milk. Even small amounts of penicillin may cause serious reactions in persons sensitive to the drug. Changes in the antibiotic regulations, relative to certification of mastitis preparations, have been instituted to correct this.

Antibiotics, when used as food preservatives, are in the category of pesticides. While tolerances have been established for residues of some antibiotics used to treat raw poultry, we think that generally antibiotics have no place in food as consumed, said Roe.

Antibiotics, estrogenic hormones, arsenicals, and other chemicals that affect growth or fattening when added to stock or poultry feed may

find their way into food. When used as growth-producing or fattening agents they are classified as drugs.

Under the law a new drug cannot be distributed unless it is the subject of an effective new-drug application, submitted by the promoter along with adequate evidence of the substance's safety. The Food and Drug Administration has held that evidence of safety in drugs intended for animal use must include proof that there are no residues in food derived from the treated animals, Roe stated.

Unsolved Problems

The problems posed by chemical additives are of great public health significance. They are particularly complex because the question of safety usually does not involve acute toxicity, but the more subtle and difficult-to-appraise chronic toxicity.

Consideration of the use of additives Roe said, involves such difficult questions as: What is the effect of regularly consuming a quantity of a chemical over periods of years? Will relatively innocuous additives adversely affect a food's nutritive values? What are the possibilities that mixtures of additives at safe levels will have a potentiating effect on toxicity? How can the chronic effect of ingesting additive residues be detected and measured in human beings?

Method Will Measure Attitudes Toward Food

Increasing a patient's self-esteem and minimizing authoritarian control over him can reduce malnutrition associated with emotional disturbance, said Dr. Franklin C. Shontz, psychologist, Highland View Hospital, Cleveland, Ohio.

When eating problems are the cause, or a contributing cause, of physical malfunction, treatment is especially difficult, from a psychological point of view. But when unhealthy eating behavior is a superimposition upon a disease unrelated

to dietary insufficiencies, treatment is possible, he said.

In this latter case, problems in eating stem from an intense emotional reaction to being ill and hospitalized. Fear, hostility, and a sense of self-disintegration are not unlikely reactions. In addition, Shontz observed, a patient may have a life-long history of borderline nutritional adjustment.

The hospital setting, Shontz said, is particularly trying. For the hospitalized patient, there is not only the necessary physical loss to face, but there may be an even greater loss: the loss of privacy; the loss of self—the possible identification as being first and foremost a disease. The whole situation is only made more difficult by the fact that one no longer has his choice of what he is to eat; one no longer picks his dining partners; one no longer decides when and where he will eat.

Under these conditions, the patient may adjust poorly to any dietary schedule. But up to now, Shontz said, there have been no means of measuring, no controlled research on, the adequacy or inadequacy of any specific regimen.

To offset this situation, Shontz offered a method by which environmental influences on eating habits could be determined.

First, he said, one must formulate a criterion of nutritional adjustment. This criterion should be able to measure (a) the adequacy of the patient's diet, (b) his attitudes toward food, (c) the manner in which food is served, and (d) the total hospital situation. The criterion would provide, Shontz said, "an index of nutritional adjustment as well as a yardstick by which changes in food acceptance may be evaluated."

Second, patients should be allowed at least limited choice in what, when, and with whom they eat. At meal times, he cautioned, "they should be fed promptly and regularly, and by people they genuinely like."

Third, after the patient has been permitted a limited choice in these matters, the choices should be curtailed for a while one by one, and

then reinstated. Each change that is really important to the patient would be reflected in the measurements established by the criterion of nutritional adjustment.

Experimentation along these lines, Shontz said, will result in better patient care and will increase our knowledge of the psychological factors in eating.

Dieting Is Inadequate For Obese People

Reducing is not a cure for obesity, paradoxically asserted Dr. Hilde Bruch, associate clinical professor of psychiatry, Columbia University. And she warned against efforts that treat only obesity and not the person.

Reducing should follow upon improvement in the obese person's total adjustment. "The ability to reduce," she said, "is only a confirmation that such improvement has taken place."

We too often look upon overweight as a deviation from a norm, she said. Decrying this attitude, she observed that individual differences are far more important in obese people than statistical similarities.

Bruch pointed out that there are many different types of obesity. Weight excess in some adolescents, for example, may simply be a function of rapid growth and development, or it may be "normal" according to their constitutional makeup. For others, overweight may be caused by physiological pathology or emotional maladjustment.

When obesity is a function of psychological maladjustment, it should be considered as symptomatic of some underlying disturbance and treated accordingly. But treatment, she said, should not be instituted on the basis of weight alone.

Condemning social derogation of obesity, Bruch called for a reeducation of the public which has humiliated, rejected, and isolated the fat person. Untoward criticism of the obese person, solely because of his excess weight, may precipitate emotional disturbances which in turn

may lead to greater obesity and perhaps to severe mental illness.

Synthetic Food Enrichment Need of Hungry Lands

If the world's population ever seriously taxes total food supply, the only way to make the cheapest foods protective is by chemical synthesis, according to Dr. Robert R. Williams of the Williams-Waterman Fund for the Combat of Dietary Diseases, Research Corporation, New York City. "It requires about seven times as much land to produce a million calories of meat or milk as it does to produce a million calories of cereals," he said.

Williams first forecast the world pattern of adoption of current types of food enrichment. The practice of enriching fats with vitamin A, if extended to cooking fats by the use of suitable antioxidants, he prophesied, would take the lead over all other types, since fats are used in some form by all peoples. There is a deficiency of this vitamin in the staple foods of the masses in developing countries, and the vitamin is cheap. Changing dietary patterns is slow, he said, and impossible if the shift in crops is uneconomic.

The practice of enriching cereals, which supply 80 to 90 percent of the calories for the majority of the world's population, is the most widespread at present, largely to offset the tendency to mill wheat, rice, and sometimes barley to whiteness. Williams concedes that such milling may someday be outlawed or abandoned, especially if the difficulty of conserving undermilled products is surmounted. However, present trends are not in that direction.

Voluntary rice enrichment in the Philippines, as in other developing countries, is inhibited by the competitive disadvantage of the added expense, but Williams feels the mandatory enforcement of that practice in the Philippines, with a conspicuous fall in the death rate, will pave the way for its success in most of rice-eating Southeast Asia.

Vitamin D fortification of milk Williams expects to be confined to areas of colder climate, and the addition of iodine to salt, to goiterous areas.

The Economic Hurdle

As for chemical synthesis of the total food supply, Williams pointed out that the major food components—carbohydrates, fats, and proteins—are produced vastly cheaper by the farmer than by the industrial producer. Under noncompetitive conditions, glucose as food has been made from woodpulp, and fats from petroleum. He also mentioned experiments combining sugarcane, an abundant crop, with blackstrap molasses and synthetic urea for the carbohydrate and protein needs of cattle.

Williams believes that for some generations to come the major supply of food will come from the farm. He questioned, however, whether all the advances in farming for another hundred years will meet the needs of a population growing at an accelerated rate.

The lack of good protein is the key challenge for ill-nourished peoples, said Williams, as evidenced by kwashiorkor among children where animal protein is low. Since animal proteins are superior to cereal proteins in three amino acids, logically by supplementing cereals with these acids in proper proportions, the deficiency would be repaired. But to produce required amounts would be uneconomic at present.

Williams' solution lies in reducing costs through large volume production. Pointing to the fall in prices of thiamine and riboflavin from \$1 a gram to 4 cents, he urged that producers be encouraged to make and market synthetic organic chemicals.

Atherosclerosis Research Seen Changing Diet

Stressing the uncertainty of the role of diet in atherosclerosis, Dr. Juanita A. Eagles, assistant research professor at the University of Pittsburgh Graduate School of Public

Health, cautioned health educators against generalizations on the subject.

At the same time, she does see the possibility of sweeping changes in the adult diet, once data from current research become definitive. Certain findings relate the diet's total calories, fat, and animal protein content with atherosclerosis and hypercholesterolemia, she said, pointing out that the "well-fed American is now said to be consuming a diet of 12 percent protein, 50 percent fat, and 38 percent carbohydrates."

Presently, the nutritionist interprets the physician's dietary directions to the patient, attempts to overcome emotional and cultural objections to the change, and studies the effect of stressful events on adherence to the diet. But as a result of research, she said, nutritionists may have the task of changing diet habits of the hypothetical "coronary-prone" United States population estimated at 50 million.

As for atherosclerosis, Eagles advised teaching dietary habits to the young in order to influence the largest number of persons and to emphasize preventive values in health practices. Besides, she added, it is easier to develop food habits in young people than to change fixed habits in the mature.

Food Enrichment Spurred In Near and Far East

A review of nutritional studies seeking ways to enrich food in several countries of the Near and Far East was presented by Dr. Arnold E. Schaefer, executive director of the Interdepartmental Committee on Nutrition for National Defense, National Institutes of Health, Public Health Service.

On official requests from Iran, Pakistan, the Philippines, Turkey, Korea, and Libya, the surveys were launched by the interdepartmental committee in January 1956, and, as part of the Mutual Defense Assist-

ance Program, were directed primarily toward the armed forces of the host country. In addition to defining nutritional needs through biochemical and physical tests and food studies, the program aimed at training personnel in evaluation techniques and providing basic equipment for nutrition laboratories.

Schaefer reported that in general the major nutrition deficiencies were of riboflavin, thiamine, and vitamins C and A. In recommending food enrichment methods, he said, the committee kept in mind possible variations in nutrition needs within each country, as well as the value of keeping in harmony with local diet patterns and nutrition concepts.

In Korea, the committee recommended that enrichment of white flour supplied by the United States be raised to 3 mg. from 1.2 mg. of supplemental riboflavin per pound.

As a result of the survey findings, the Pakistanis are now conducting a study on effects of iodine intake on goiter in adolescents, and on related production and distribution questions.

In Turkey, Schaefer said, flour enrichment with riboflavin was being considered. The committee recommended increased fortification of margarine with vitamin A as well as control measures to insure the new level. Also suggested was a more even distribution of leafy vegetables, citrus fruits, and of the native "rose cake," a rich source of vitamin C.

In the Philippines, the committee recommended that the rice enrichment successful in Bataan against beriberi be extended throughout the islands, said Schaefer.

For the Republic of China in Taiwan, the committee advised that a rice enrichment pre-mix plant be set up and that pre-mix feeding machines be installed in mills supplying the Army. Surplus plant capacity would produce enriched rice for schools and other official institutions, he said. To avoid delay in raising enrichment levels, the alternative use of an enrichment wafer

was recommended and initiated, with the advantages of standardized recipe and equipment, rapid operation, low cost, and uniform rice color.

Among sidelights of the surveys, Schaefer recalled that in Libya, despite inadequate intake of calories, riboflavin, thiamine, and vitamins C and A, classical signs of nutritional deficiency appeared in few men examined. Such findings, he said, underline the need for study of body adaptation to suboptimal intake of multiple nutrients.

He remarked also on the value of *kimchi*, a preserved mixture of radishes and Chinese cabbage noted in the surveys, which is an excellent source of vitamins C and A for winter. Food fortification may well use fermented products someday, he said, citing also the enrichment of *miso*, a fermented soybean product of Japan, and Japanese experiments on a high riboflavin producing yeast for fermenting *miso*.

Psychiatrist Prescribes Look Into Diet Changes

Any public health dietary prescription must take into account symbolic and emotional meanings of food and eating, according to Dr. Walter W. Hamburger, associate professor of psychiatry, University of Rochester School of Medicine and Dentistry.

Food preferences as well as eating habits are emotionally invested with these personal meanings. Each individual's life experience determines them. The child's emotional relationship to his mother and other early childhood experiences in the family are potent factors in setting eating patterns, Hamburger maintained. The cultural pattern in which people live plays a large part in establishing non-nutritional meanings to food and eating.

Some people are aware of the reasons for their food likes and dislikes; others are not. Some of these associations and symbolic meanings have been learned from clinical psy-

MENTAL DEFICIENCY

chiatric and psychoanalytic experience, Hamburger said. Some general principles have been derived, but research is needed in many specific areas, such as decreased or altered fat intake.

The motivation for dietary changes and possible emotional complications arising from attempts to make major changes in the diet will contribute to the efficiency of any dietary public health program. There is evidence that emotionally stable individuals can more easily modify their diets than can those who are not stable. This observation has been made in response to the question of reducing diets for the obese.

Similarly, the incidence of emotional complications ensuing from major dietary changes would be greater in the emotionally unstable. This is because certain individuals utilize specific eating patterns and even specific foods to satisfy their emotional as well as their nutritional needs. For such individuals, attempted alterations of eating patterns for nutritional or public health program reasons may lead to emotional complications. Hamburger feels this is less likely when food substitution is recommended (unsaturated for saturated fats) than when total food restriction is advised (low-calory reducing diets).

temperature was above the median for those months, first admission rates increased. Admission rates were 1.658 per 1,000 for July and 1.519 per 1,000 for August, compared with 1.276 and 1.206, respectively, in those years when the mean temperature was below the median. Total admission rate, when the weather was hot in June, July, and August, was 1.524, compared with 1.295 when the weather was cool ($\chi^2=10.02$; $P<.001$). On the basis of mean temperature, July's difference is three times as great as the difference between the first and third quarters of all the years under investigation.

The accompanying table compares first and third quarters, and months within those quarters, for significant variations.

The significance of their findings for public health workers, they believe, lies in the fact that environmental rather than inherited factors may play a larger role in the formation of the individual than heretofore believed. Public health workers, the report recommends, by paying greater heed to dietary control, particularly in hot months, can take measures to prevent mental deficiency.

Mental Health . . .

Climate and Diet Cause Mental Deficiency

Inadequate diet in early pregnancy during hot summer months may have an adverse effect on child development, according to Dr. Hilda Knobloch, director of the child development clinic and associate professor of pediatrics, and Dr. Benjamin Pasamanick, director of psychiatric research and professor of psychiatry, both of the Ohio State University College of Medicine, Columbus.

Since damage to the cerebral cortex during its formation in the third month after conception could affect intellectual functioning, the authors originally sought to test the postulate that the prevalence of viral infections during winter months would result in a greater incidence of mental deficiency among infants conceived in those months than at any other time.

Their findings, however, introduced another hypothesis, because the first trimester of mentally deficient children occurred more frequently during the summer than

winter. The cause of mental deficiency, therefore, Knobloch and Pasamanick suggested, may be related to the tendency of expectant mothers to reduce their food intake, especially proteins, to dangerously low levels during hot weather.

This conclusion emerged from the study of the records of 5,855 admissions of mentally defective children to the Columbus State School between 1913 and 1948.

In these records they found, for example, that when the eighth to twelfth week of pregnancy occurred in July or August, and the mean

Problems in Measuring Patient Changes Outlined

The number of patients resident in public mental hospitals (exclusive of the Veterans Administration) in

Admission rates for mental deficiency, by season of birth, Columbus State School, 1913-48¹

Season	Number of births ²	Number of admissions	Rate per 1,000
February ³	339,704	512	1.507
August ³	377,085	489	1.297
January, February, March ⁴	1,064,183	1,535	1.442
July, August, September ⁴	1,112,933	1,467	1.318

¹ Excluding 1946. ² Number of births in each month supplied by the Ohio State Health Department. ³ C.R.=2.3; $P<.02$. ⁴ C.R.=2.4; $P<.02$.

the United States decreased in fiscal year 1955-56 from 559,420 to 552,005, the second decrease ever noted in these hospitals.

Moreover, the observed number of resident patients was 21,855 less than the 573,890 patients expected on the basis of the 1945-55 trend. This deviation from trend was by far the greatest that occurred in the period under study.

These are some of the facts uncovered by Dr. Morton Kramer and Earl S. Pollack of the Biometrics Branch of the National Institute of Mental Health, Public Health Service.

Since the decrease occurred at a time when tranquilizers were being used extensively, Kramer and Pollack discussed the problems involved in assessing the effect of tranquilizers as well as other therapeutic procedures on patient movement in hospitals. Their analysis emphasized the inadequacy of crude movement data in making these assessments, and they suggested a data collection method that would yield more sensitive indexes.

Expected and Observed Values

In comparing observed values in 1956 with those expected on the basis of the 1945-55 trend in the public mental hospital systems of the 48 States, Kramer and Pollack found:

- Admissions were higher than expected in 24 and lower in 24.
- Net releases were higher than expected in 33 and lower in 15.
- Deaths were higher than expected in 42 and lower in 6.

Population Changes

Gross changes in a mental hospital resident population, Kramer and Pollack pointed out, are a result of additions to and removals from a baseline population. They show, in the accompanying chart, how this addition and subtraction takes place.

The chart portrays a hypothetical hospital with a resident population of 1,000 at the beginning of a year. During the following 12 months, 303 persons are added (243 admissions

and 60 returns from extramural care), and 276 are removed (187 releases and 89 deaths). Since additions exceed removals by 27, the resident population at the beginning of the next year is 1,027.

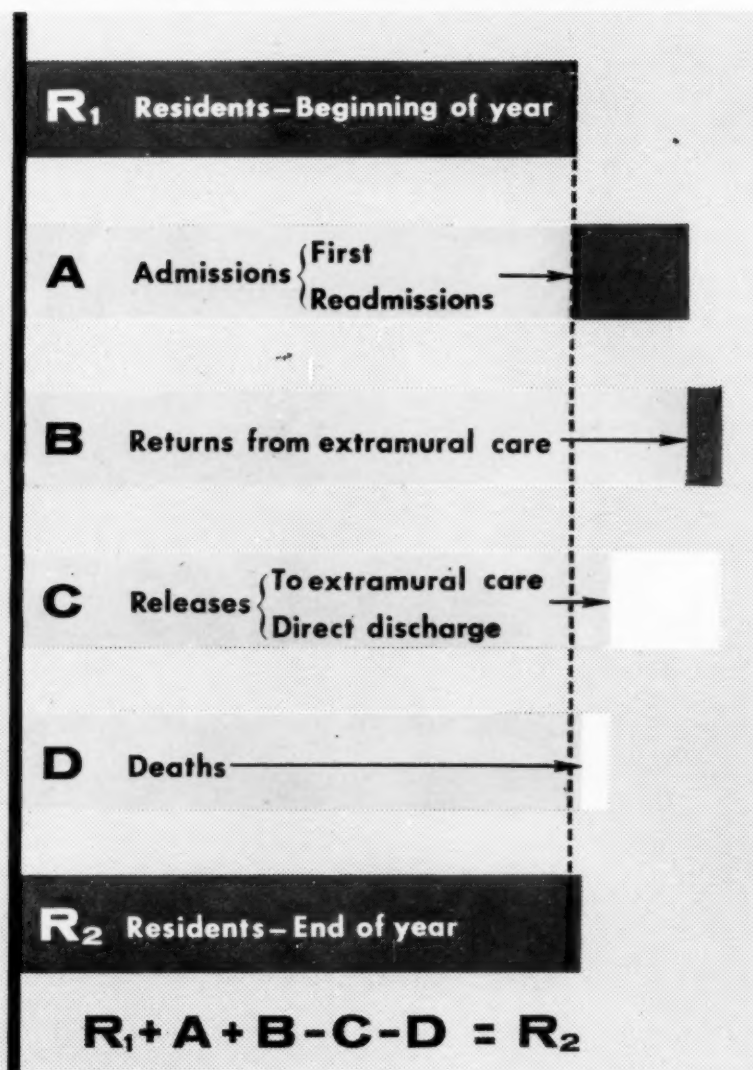
National data are available, the authors added, on all movement items except B and C in the chart. It is possible, they pointed out, to determine C-B, which is the net number of patients released to the community in any one year.

The authors emphasized that changes in size of resident population between two points in time is a

function of three variables—admissions, net releases, and deaths. They stated, "If we are to understand the factors that account for the rise and fall of mental hospital populations, we must undertake studies that relate variations in admissions, net releases, and deaths not only to hospital factors but also to extra-hospital factors which can affect these variables."

To provide some of the information needed for proper analysis, Kramer and Pollack suggested the compilation of (a) resident patient cards at the start of each year containing

Gross changes in a mental hospital resident population.



basic data on each patient, such as age, sex, diagnosis, duration of hospital stay, and any other desirable data, and (b) patient movement cards recording significant movements in or out of hospitals during a year. These cards should contain the same information on each patient as the resident patient cards.

The introduction of new treatment methods and new psychiatric facilities affects the use of facilities and treatment in the reduction of disabilities from mental disorders. Measuring these effects, the report concludes, is an epidemiological problem.

To quantify the impact on the mental hospital of tranquilizing drugs and such other therapies and programs as may be developed in the future requires revision of existing statistical systems. But equally important, the authors went on to say, is the development of programs which will coordinate data on utilization of all community treatment facilities so that the mental hospital's role can be studied in relation to that played by these other community facilities in the treatment and rehabilitation of the mentally ill.

Interview Experience Eases Relationships

Public health workers develop greater self-confidence as a result of 5-day interpersonal relations institutes, according to Hyman M. Forstenzer and Dr. Joseph J. Downing, New York State Department of Mental Hygiene, and Dorine J. Loso, Public Health Service, Denver, Colo.

The authors described and evaluated 4 institutes of 11 conducted by the departments of health and mental hygiene in New York State since 1950.

Description

The institutes were normally composed of 25 voluntary participants meeting in a relatively isolated community where beneficiaries of health services were available for interview-

ing. Several members from each of several health units were invited to participate because it was felt that the effect of the experience would be greater and more lasting than if only one attended.

Demonstration interviews were held in the mornings. In these, the participants observed a psychiatrist and his subject through one-way vision mirrors and listened through headphones to their conversation. The psychiatrist who conducted the interview informed his subject that public health people were listening; but not that they were looking.

The participants' attitudes toward these interviews were later analyzed, and it was found that they had at first identified themselves with the client, but gradually shifted identification to the psychiatrist. By the fourth day, the shift was complete. This experience brought into the open the reluctance of participants to ask people about their life situations, a reluctance indicative of a general resistance to self-appraisal.

This resistance, on the other hand, produced tensions upon which the success of the institute depended. The most successful institutes, the report states, were those where initial tensions were high and gradually came to their lowest point on the last day.

In the afternoon, participants conducted interviews, each on his own unless he wished to include others. A psychiatrist maintained control over the proceedings. Morning and afternoon interviews were followed by discussions.

Evaluation

The participants found the institutes valuable. The report states, "They tell us their approach to fellow workers and to clients is easier, more pleasant, and more rewarding."

Objective psychological tests, administered by the institute's staff when it was over, revealed that participants were less dogmatic and less rigid in their behavior. At the same time, there was a loss of interpersonal acuity and an increased ac-

quiescence to authority. These latter tendencies disappeared within 6 months, and a greater self assertiveness, expressed through self-confident behavior, was found, the authors reported.

Psychiatrist's Time Used Economically

"The child psychiatrist in a public agency can make his greatest contribution to the mental health of his community by functioning as a diagnostic consultant . . . and by delegating appropriate therapeutic tasks to ancillary personnel."

This approach will increase the number of patients the psychiatrist will be able to see, according to Dr. Leon Eisenberg, assistant professor of psychiatry and pediatrics at the Johns Hopkins University and Hospital, Baltimore.

Eisenberg submitted results obtained from a special diagnostic clinic set up to help 48 foster children who were emotionally disturbed.

Treatment began with a diagnostic conference to determine type and severity of disturbance and suitable placement for the children. After these decisions, case workers from the welfare department were given the responsibility "to develop a sustaining relationship with the child, to interpret clinic findings to foster parents, schools, and court, and to secure group activities."

Among other therapeutic measures were the assignment of Big Brothers, speech correction, and the substitution of new peer activities for the company the children had been keeping.

After an average interval of 1 year, the 48 children were resurveyed. Information was obtained on 44 of them. Of these, excluding 6 who were institutionalized, 27 (71 percent) showed improvement.

Since 11 of the 38 children actively treated did not receive the recommended treatment, for one reason or another, a comparison of this

group with those who did receive recommended treatment was possible, and the advantage of psychiatric consultation, Eisenberg pointed out, could be determined. Where the treatment plan was not followed, only 3 showed improvement (27 percent); where the treatment plan was followed, 24 showed improvement (89 percent).

These figures indicate, Eisenberg concluded, that a good consultation service for foster care children results in substantial improvement.

During treatment, several factors were uncovered relating to staff morale and the promotion of good consultation services. Agency workers, Eisenberg said, should be included in discussions and preparations of social histories without interposing psychiatric social workers between them and the clinic team. He also suggested that test analyses and clinical opinions should be expressed in clear terms, avoiding jargon. Remarks not relating to actual behavior may only confuse the agency worker or suggest difficulties beyond the scope of her abilities.

Epidemiological Method Measures Child Behavior

An epidemiological method for measuring behavior in children was reported by Dr. Rema Lapouse and Dr. Mary A. Monk, associates in preventive medicine and public health, University of Buffalo School of Medicine. Dr. Lapouse is also an associate in psychiatry.

Their report covered a pilot study of 482 children between the ages of 6 and 12. The sample used was representative of the population of Buffalo. The subjects thus were children "who are not likely to be picked out of the community for psychiatric examination and therefore have little chance of contributing to the statistics of symptoms."

Because of the general difficulty in differentiating reliably between normal and abnormal behavior,

Lapouse and Monk preferred avoiding definitions of pathological behavior. They developed instead "a method for measuring the prevalence and interrelations of certain behavior characteristics of children." The ultimate aim, they said, is to gain accurate knowledge of the prevailing forms of behavior of children, their frequency and severity, and their correlation with the adjustment and function of each child so that deviations from the usual pattern may be more objectively evaluated and, consequently, an effective method for identifying the psychiatrically sick child in the community may be evolved.

Mothers Interviewed

Mothers were used as the primary source of information on child behavior. Interviews, 1½ hours long, were designed to elicit information on the child as well as on certain family and household characteristics. Interviews were obtained with 94 percent of the sample. Information was sought on a wide range of child behavior including social and intellectual behavior, body control and coordination, habits, and physical and mental factors that modify or limit behavior. In a check on the validity of the mothers' responses, a new sample of 193 mothers with one child each was selected for interview. Mother and child were interviewed separately but simultaneously. Both groups were asked the same questions, and the responses were compared.

Since the pilot study was undertaken primarily to develop a valid and reliable epidemiological method

for the investigation of behavior in children, and since an analysis of only a small part of the data collected is reported, the actual findings are tentative, the authors said.

Responses Compared

With regard to the validity of the mothers' responses, Lapouse and Monk found that the mother's agreement with the child is highest when the behavior is concrete, objectively observable, or has a high nuisance value as measured by social standards. Thus mothers could be relied upon to agree more consistently with their child when reporting bed wetting, thumbsucking, stuttering, and so on.

There was far less agreement between mother and child on subjective behavior such as nightmares, amount of food eaten, restlessness, overactivity, or fears and worries. Indeed, 40 percent of the mothers, they found, underestimated the fears and worries of their children.

In the partial analysis of their data Lapouse and Monk observed that for a representative sample of children mothers reported a high prevalence of several characteristics commonly thought of as pathological. The authors raised questions as to the interpretation of this finding: whether it means that a large number of children are psychiatrically ill, or whether these characteristics occur in essentially normal children. It was suggested that the answer may lie in an evaluation of the children's capacity to function effectively in their environment. The authors plan to report on this aspect of their investigation in the future.

Water, Wastes, and Safety . . .

Public Health Hazards Created by Radiation

Developing sound criteria of maximum exposure of individuals and the general population to radiation

is at once vitally important and tremendously difficult, averred Roy J. Morton, associate leader, Waste Disposal Research and Engineering Section, Oak Ridge National Laboratory.

RADIATION HAZARDS

Morton reviewed the need for integrating radiation protection with public health practice and gave examples of the expanding use of nuclear energy. In addition, he discussed some of the aspects of control, specifically preventive control, of environmental exposure to radiation.

Need for Control

In the past, Morton pointed out, some people were seriously injured or killed by radiation from X-ray machines or other sources of radiation, and protective measures were left to specialists. Radiation control was an individual concern.

Today, ionizing radiation has become a community burden. Not only is there background radiation, but there is an accumulation of public dosage from exposure to radiation used in medicine, dentistry, industry, research, and weapons development. These sources of radiation are in addition to nuclear energy operations for which comprehensive radiation control measures have been provided to protect workers and surrounding communities.

"The basic public health responsibility is to maintain all radiation exposures within the generally accepted limits without in any way discouraging the utilization of radiation sources to their maximum advantage," Morton said.

Radiological Health

"Radiological health," Morton explained, "is generally accepted as the inclusive term for all public aspects of ionizing radiation in relation either to the prevention of injury to people or the uses of radiation and radioactive substances to improve public health. The primary goal of radiological public health is to avoid all unnecessary radiation exposure of human beings. It is impossible, of course, to limit exposure to zero, but exposures above zero should be regarded as undesirable and condoned only when the gain from such exposure warrants the risk. The minimum public health responsibility is to be sure that accepted

standards of maximum permissible dosages are observed including recommended limits for the total population which should be set at levels well below those that are acceptable for persons occupationally exposed to radiation."

Eventually, Morton believes, radiation control procedures will be integrated with established public health practice and will be handled in much the same way as other public health activities.

Health Problems

The use of X-rays, Morton said, constitutes the most urgent and widespread source of critical public radiation exposure. At the present, some of the aims, Morton indicated, are "to improve X-ray machines, installations, and techniques so as to minimize the radiation exposure of operators and patients." It has been demonstrated that familiar techniques can reduce individual diagnostic X-ray exposures more than 95 percent, and completely shield critical areas of the body, with no loss in utility of the X-ray picture.

The use of radionuclides in research constitutes a relatively minor source of exposure. The list of radionuclides, published by the Oak Ridge National Laboratory, now includes about 85 processed elements, with a half-life varying respectively from less than a day to millions of years.

Radionuclides are frequently employed as tracers, Morton said. Small quantities of short-lived radionuclides suffice for most tracer applications because of their sensitivity to counting methods, and hazards can be avoided by using small amounts of quickly decaying radioactive material. On the other hand, radionuclides as high level radiation sources may involve large amounts of radioactive materials and high radiation fields. The techniques of elaborate shielding and other safeguards for high level radiation uses have already been developed and evaluated, Morton said.

The greatest prospective source of radiation is the nuclear high-energy

power reactor, he said, but also noted approximately 25 low energy installations designed for use in research and training. The number of reactors is increasing rapidly. The source of radiation of most concern to the public is the fission product rather than the process of fission itself.

Unless fission is replaced by a fusion process, which creates no radioactive products, radioactive wastes will be one of the major concerns of radiological public health, Morton pointed out. By the year 2000, there should be "an accumulated volume of high-activity reactor fuel process wastes of the order of 550 million gallons and with total accumulated radioactivity of many billions of curies."

Industrial Uses Grow

Citing information from the Atomic Energy Commission, Morton indicated the rapid expansion of the Government's nuclear energy operations:

- Government investment in atomic energy plants and equipment increased from \$2 billion in 1951 to \$6.5 billion by July 1956.

- In fiscal year 1956, the Commission spent \$177 million on reactor development and related activities, nearly \$52 million of which was for civilian experimental power reactors.

- The AEC research and development program, exclusive of support to military projects, costs about \$250 million each year.

- In fiscal year 1956, \$18 million went to private contractors for some 800 research projects.

The 22d semiannual report of the AEC for January-June 1957, Morton pointed out, lists 267 reactor facilities that have been planned, or built, or are in the process of being built. Five full-scale civilian power reactors are being built and 17 are in the planning stage. Of the 22 chosen locations for these reactors, 16 are distributed in 10 States, Puerto Rico, and Alaska; 1 is in New England, 2 in the Ohio Valley, 1 on shipboard, and 2 are unspecified.

After advising against exaggerating and overpublicizing the promise and hazards of nuclear energy, Morton concluded that "the logical objective is to deal with the radiological health and environmental control problems as they now exist, to study and learn more about the fundamental factors involved, and to develop rational methods of control that are as conservative and adaptable as possible."

Clean Water Law Aids 700 Communities

About 700 communities were offered Federal aid and 600 others applied for grants during the first year the Federal Water Pollution Control Act of 1956 has been in effect.

Robert R. Harris, chief, Construction Grants Section, Water Supply and Water Pollution Control Program, Public Health Service, discussed this and other consequences of the legislation.

New facilities and improvements to existing sewage works costing more than \$250 million have already been aided by this act. Federal contributions for the first year reached \$56,237,000; a ratio of 4 local dollars to each Federal dollar, Harris stated. The law limits the Federal share of grants to \$250,000 or 30 percent of the cost, whichever is less.

He noted that the \$95 million appropriated for grants during the first 2 years is far short of the amount communities have already requested.

The Federal grants have made their biggest impact upon small communities, Harris stated. The first 127 Federally aided sewage treatment plants in 7 midwestern States will reduce pollution from municipal sewers in 1,700 miles of streams to satisfactory levels. Ninety percent of the communities these plants serve have populations under 25,000.

The legislation provides that half the grant funds must aid communities of 125,000 or less; 84 percent of the funds already allotted have gone to communities in this category.

State Participation

The most significant feature of the act, Harris said, is the reaffirmation by Congress of the States' primary right and responsibility to prevent and control water pollution. Federal activities primarily support and supplement the efforts of State and local agencies.

Municipalities wishing Federal aid must first apply to their State water pollution control agency. The State approves the application and certifies that the proposals it contains have priority over others in the State.

The act specifies that the priority must be based on financial as well as water pollution control needs. A Federal grant offer is made subject to the terms and conditions specified by the State and the Public Health Service.

Financing methods the communities have used depend upon their fiscal resources and State laws. General obligation bonds, certificates, or warrants payable from ad valorem taxes of a municipality are most popular. But revenue bonds and certificates and special assessment bonds have also been used. Often a community raises funds from several sources such as unencumbered cash, proceeds from several types of bonds, Federal loans, and grant moneys from State and Federal governments.

Several State governments now offer assistance to communities. Partly stimulated by the Federal Water Pollution Control Act, the Maine, Maryland, and Vermont legislatures in 1957 established supplementary grant programs. New Mexico voted special assistance to rural unincorporated areas, and Ohio created an emergency Village Capital Improvement Rotary Fund to make advances for planning.

New York, Pennsylvania, California, and Oregon already had some form of State assistance.

Law's Impact

The act contains broad definitions: treatment works include interceptor

and outfall sewers, pumping, power, and other equipment, as well as extensions, improvements, remodeling, additions, and alterations of existing treatment works; construction includes preliminary planning, necessary engineering, architectural, legal, and fiscal investigations and services, preparation of designs, specifications, and plans, and inspection and supervision of the construction.

As a result, Harris said, many treatment works not otherwise possible are being built through combined Federal, States', and local governments' efforts.

The Federal grants already offered will aid sewage treatment plants serving 10,500,000 people and an estimated 14,900,000 in the future. Harris pointed out, however, that some 9,000 communities need new or improved facilities.

The Nation's annual per capita expenditure for construction of municipal sewage treatment works is about \$2.42, based on the 1950-54 average. Even if this rate is maintained until 1985, the population equivalent of sewage still delivered to streams then will be 25 million higher than it is today, Harris stated.

Bonds Finance County Water, Sewage Plants

Methods used to finance the 97 sewage treatment plants and 150 water plants in Harris County, Tex., were described by Roger Moehlman, sanitary engineer, Harris County Health Unit.

Outside Houston, with its 900,000 population, 200,000 people live in small cities and unincorporated areas where suburban development has mushroomed since 1945. In these fringe areas 15,000 lots were subdivided in 1955, 13,000 in 1956. Water supply and sewage disposal facilities were lacking, and most suburban developers had to provide these services for their own subdivisions.

Septic tanks and shallow wells

WATER AND SEWAGE

were eliminated in most developments by policies of the Federal Housing Administration, Veterans Administration, and loan companies. The agencies did not insure or the companies lend money for purchasing homes unless the Harris County Health Unit approved sewerage and water systems. The unit also inspected and approved plants built according to plans approved by the State health department. Sewage disposal systems are required to have a complete treatment plant; often effluents flow into dry ditches or streams with inadequate flow.

Financing Methods

Water and sewerage systems in Harris County were financed through city systems with city bonds, water control and improvement districts, fresh water supply districts, and private capital, Moehlman stated.

Under Texas legislation a State board of water engineers can create a water control and improvement district after hearings called upon petition from those living or owning property in an area. Subsequently, elections are held to approve the district and to vote bonds for financing the construction of facilities.

In both water control and fresh water supply districts, general obligation bonds are voted; interest rates on these bonds can be lower than those based on revenue alone, and they are more marketable.

Fresh water supply districts are established by filing a petition with the county commissioners court. The court, after a hearing, can create the district. Elections are then held to approve the district and vote financing bonds.

Originally, the fresh water districts were formed when effluents from septic tanks and privies caused pollution. Some Harris County subdividers, however, set up districts for their development before building many houses. The districts can be created with only five people in the area to vote the money for the

entire subdivision's water and sewerage systems.

This district's advantages: its bonds can be sold and the subdivider need not keep money invested in facilities; bonds sold at 90 percent of face value often go to par or above when a city assumes the district's obligations; a city can annex a district simply by assuming the system's liabilities and operation.

Subdividers unable to borrow money to install water and sewerage systems in their developments used their own funds to provide these services.

Subdividers obtained services by arranging with a contractor to install the water supply system, sewerage, paving, and street lights in return for a lien on the property, by putting in water and sewage lines so that existing systems could be extended to the new developments, or by building and operating these services themselves.

These private systems, although planned in their entirety, generally were built piecemeal. Lines were installed as needed and some sewage treatment plants were constructed in stages, although providing complete treatment at each stage.

Similarly, water lines were put in street by street, and water supply plants began with one well and pressure tank, adding tanks with high lift pumps, additional wells and storage tanks, or another plant as needed.

These methods were developed over several years. When the county's suburban development began, each subdivider financed water and sewerage systems his own way. The subdividers realized the advantages of community systems over septic tanks and private wells, although the initial cost was about the same.

During the building boom, many water and sewerage systems made money in their first year of operation. Now, however, Moehlman said, building rates seem normal or below normal in Harris County, fewer homes are sold, and small pri-

vate utility operations take longer to become self-supporting.

Survey Made

A survey of installation costs, operating costs, and revenues showed that installing water and sewage disposal services in districts where homes were already built cost more per connection than when the subdivider constructed the facilities.

The developers built on every lot in their subdivision, while the water districts serve only existing homes. One water district had facilities for 2,789 lots, but only 1,230 homes were connected to the lines after a year's operation.

According to Moehlman, installing water and sewage facilities in the water district cost \$348 per lot, in the subdivision, \$340. But the cost per connection in a water district was \$790, while the subdivider paid a smaller sum for each connection, he pointed out. The district's taxes and other revenue must offset this larger capital outlay and yearly expense. However, as more homes were built on once vacant lots, taxes and rates decreased.

The privately owned systems adopted existing city or water district rates without knowing operating costs or potential returns. Competing subdividers offered free water for a year as a buyer inducement, or halved rates to nurture beautiful green lawns in one development.

With careful planning, engineering, construction, and operation, even small water and sewage disposal systems need not be a detriment, Moehlman declared.

He concluded that Harris County's numerous water and sewerage systems for the subdivisions were not ideal. In some ways the multiple systems are only a step above using septic tanks and private wells. But they suit the county's present situation.

Ultimately the city of Houston could annex all these systems and eliminate many small sewage treatment and water supply plants.

However, pending any such move, fringe areas outside the city will need more small plants, he said.

Perhaps a countywide sanitary district to handle all water and sewage disposal services would be best, Moehlman stated.

Attempts Made to Measure Effects of Air Pollution

Air pollution in many cities around the world has created a substantial health problem, said Dr. Lester Breslow and Dr. John Goldsmith, bureau of chronic diseases, California State Department of Public Health.

But, they went on to say, "if we are to attack air pollution as an environmental influence detracting from health as well as causing disease and death, then it seems desirable to measure the extent to which it does interfere with well-being."

In 1956, in an attempt to measure the effects of air pollution on health, the California State Department of Public Health sampled 3,545 households. Forty percent stated they were bothered by air pollution. In Los Angeles County, 60 percent reported various unpleasant physical reactions. The surveyors found that 1 out of 8 Los Angeles households was considering change of residence because of air pollution, while some were thinking of changing their jobs for the same reason. Commenting on this situation, Breslow and Goldsmith said, "Interference with well-being to the point of changing residence or job represents a disruption of health which certainly qualifies smog as a public health problem."

The possibility that air pollutants are causally related to lung cancer and respiratory diseases has led to several studies here and abroad, and, the authors noted, the English have had some success in relating chronic bronchitis to air pollution.

Attempts to measure the relationship of air pollution to chronic diseases in this country, however, have

not been conclusive, according to Breslow and Goldsmith. An investigation in 1956 to confirm the impression that episodes of smog precipitate asthma was inconclusive.

Since 1954 the California State Department of Public Health has been studying daily mortality data from Los Angeles, but has not as yet demonstrated any effect of air pollution on mortality. A special study of 4,000 nursing home patients, who, the authors believe, would quickly reflect any adverse environmental condition, has revealed no definite effect on mortality from air pollution alone. But, the authors admonish, this does not mean that no effect occurred.

Present knowledge of the health implications of air pollution demands strenuous control efforts, but Breslow and Goldsmith stressed the fact that "research on the health effects must be pursued with equal vigor in order to identify the aspects of air pollution which are most dangerous to human life and well-being."

Deep Wells Found Practical For Waste Disposal

Deep wells are the cheapest, most practical method of disposing of chemical waste, stated W. H. Wallace, fine chemicals department foreman, Upjohn Company, Kalamazoo, Mich. The company now pumps 25 million gallons of waste per year into the substrata at a cost of \$2 per 1,000 gallons.

The firm turned to wells in 1954 when the swampy area, previously used for disposal of wastes from fine chemical production and processing, became seriously contaminated.

It is generally agreed that a successful disposal well must be located in a favorable geologic structure, such as sedimentary rock formations, including sandstones, limestone, and dolomites, he said. These strata are often several thousand feet thick in the North Central States. Their porous capacity is large; wells pump

into a substrata approximately 15 percent void.

Disposal Wells Favored

According to Wallace, Michigan's State regulatory body, the Water Resources Commission, favors using disposal wells if they are cemented in and properly constructed. The State's geological division does not fear contamination of the potable water strata when the disposal well discharges at 1,000 feet below the well water aquifer.

The company's first disposal well, drilled in 1954, was an 8-inch well with a 7-inch steel casing inside and the area between sealed with concrete. As additional protection against contamination, waste is pumped through a 2-inch, high-pressure line, sealed at the top and bottom of the well. A leak in this line is instantly detected by watching the pressure developed in the annular space.

The cost of the well method is higher than the cost of biological disposal. But the large amount of lime neutralizer used was also necessary in the previous system, because the concentrated waste has an extremely high chemical oxidation demand. Liquid waste must be neutralized, clarified, and filtered before being pumped into the wells. If another well and injection pump were added, the cost per 1,000 gallons would decrease since the present labor force could handle 50 to 75 percent more volume.

Useful Life

Disposal wells always lead to the question of how long they will last. Upjohn may have a partial answer from its 3 years' experience.

The company uses 2 high-pressure injection pumps operated together and singly, 6 days a week, and records each day's maximum and minimum pressure. At the start, the maximum pressure was approximately 980 pounds per square inch and the minimum, 500. Today the maximum has dropped to 800 pounds, but the minimum is 750.

The pH also affects pressure. A 5.5 pH is usually maintained for well injection. To improve filtration the pH was raised to 6.0 or 6.5. But the pH increase raised the maximum pressure to 900 or 950 pounds. Returning to a 5.5 pH brought the pressure to 800 within a couple of months. This indicated to Wallace that a low pH was necessary to maintain the openings in the strata through which the waste is injected.

The injection process also works against the normal head of approximately 750 pounds needed to push the waste into the voids. Wallace believes the present wells will continue to operate satisfactorily until the void is filled.

Sanitation Experts Can Cut Accidents

Accident prevention is the responsibility of the total public health program, and the local environmental health group has several opportunities to make a major contribution, according to Eugene L. Lehr, chief, Program Services, Accident Prevention Program, Public Health Service.

The skills of the public health engineer and sanitarian in observing and correcting environmental sanitation hazards may be readily extended to environmental accident hazards. There are six stages, Lehr suggested, where accident prevention measures may be applied with environmental operations:

1. In the investigation of nuisance complaints the concept of home safety can be brought directly to the attention of households.

2. When food processing or handling plants are inspected, safety can be promoted as well as cleanliness.

3. Sanitarians conducting insect and rodent control have the opportunity to detect accident hazards and to advise or assist on corrective measures. At the same time, they also have the opportunity of exploring the subject of accidental poisonings.

4. Since the sanitation section frequently plays a leading role in the regulation and inspection of institutional facilities it has the opportunity to detect and eliminate accident hazards there.

5. Recreational facilities, especially neighborhood and private swimming pools, require more than advice and assistance on water treatment. They are sources of many accidental injuries.

6. Finally, the sanitary engineer and sanitarian can contribute materially to the study of housing in his community, and to the establishment of neighborhood improvement campaigns, urban rehabilitation programs, and housing codes designed to prevent the deterioration of existing housing as it ages and as conditions of occupancy change.

Aerosol Methods Applied To Drinking Fountains

Aerosol studies will tell us if drinking fountains are a potential vehicle of disease transmission, according to Dr. W. N. Mack, professor

of microbiology and public health, Michigan State University.

Preliminary investigations show, Mack said, that viable virus particles can be recovered by the aerosol method. After feeding T_2 bacteriophage into an angle jet stream of a drinking fountain, 630 liters of air from surrounding areas were collected at 5-minute intervals, 14 inches above the rim of the bowl. Three samples out of five contained 2.1, 52.0, and 2.3 virus particles per liter of air tested.

Aerosols from the splash of the drinking fountain produced inconstant amounts of virus, Mack said, because drops of water from the fountain were influenced by the sampler's air flow, and the fountain did not produce an evenly dispersed atomization of virus. The distance at which viable virus particles may be collected, he reported, is at least 48 inches from the apex of the stream and in the opposite direction from the flow.

To determine whether the drinking fountain is a potential health hazard or not, Mack pointed out that the sanitarian need only apply the available tools and methodology.

Chronic Diseases . . .

National Program Aids Cancer Chemotherapy

The national cancer chemotherapy program, initiated in 1953, comprises one of the greatest mobilizations of resources ever undertaken to conquer a single disease, said Dr. Kenneth M. Endicott, chief, Cancer Chemotherapy National Service Center, Public Health Service. Both government and private agencies have joined forces in this program of accelerated research on cancer chemotherapy through encouraging voluntary cooperative studies in certain areas and at the same time supporting individual investigators.

Sponsoring agencies of the program are the National Cancer Institute, the American Cancer Society, the Damon Runyon Memorial Fund for Cancer Research, the Veterans Administration, the Atomic Energy Commission, and the Food and Drug Administration.

Program Organization

One of three groups under which the program has been organized is the Cancer Chemotherapy National Committee. This policymaking group is composed of a member from each of the sponsoring agencies, a member-at-large, and a member from the pharmaceutical industry.

Another group is the Industry Sub-

committee which advises on industrial problems and promotes industrial participation in cancer chemotherapy research. It is composed of industrial research executives who serve as private individuals and not as company representatives.

The Cancer Chemotherapy National Service Center, the third group, has a full-time staff which administers the program recommended by the national committee, organizes and operates the needed technical advisory panels, arranges for the exchange of information, promotes cooperation among scientists, and otherwise implements the national program.

The existing program is a mixture of empiricism, exploration of existing leads, and support of that basic research which appears to offer the possibility of yielding useful information, Endicott stated. At present too little is known of the nature of cancer and the agents that temporarily inhibit its growth to allow discarding any likely material without at least a preliminary trial, he said.

National Service Center

To give the program direction, the center established five technical advisory panels: chemistry, screening, pharmacology-biochemistry, endocrinology, and clinical studies.

Some 45,000 materials are sent annually to the center for antitumor test by research organizations, universities, and pharmaceutical and chemical companies. These materials are screened against three types of mouse cancer—sarcoma 180, carcinoma 755, and leukemia L1210—especially chosen for their ability to indicate anticancer agents. Six screening laboratories are under contract to the center, and negotiations are under way with several pharmaceutical companies for inplant screening.

For the development of better screening methods, microbiological methods, tissue culture, and human tumors in animal hosts are under study. Also being sought are reliable biochemical techniques for in-

dicating the cancer destroying properties of chemicals, hormones, and antibiotics.

When a pharmacological compound is found to have anticancer activity in the screening, animal studies are made to see what happens to the drug in the body. Before human trial is initiated, proper dosage and toxicity are determined.

Clinical trials are made by 11 cooperative study groups which represent more than 100 medical schools and hospitals in different parts of the country. End results are analyzed through tumor registries which are set up to provide data annually on all types of cancer and to undertake special studies on the effect of various treatments.

For better communication of research findings, a documentation center for information on cancer chemotherapy has been established at the center. A current bibliography, beginning with 1946, is available, and a series of reports are being issued to qualified investigators.

Other services offered by the center include procurement of chemicals and radioactive compounds for research purposes, arrangements for screening, pharmacological studies, and arrangement of interinstitutional cooperative clinical trials for large-scale evaluation of promising compounds. Information on technical problems as well as on grants, fellowships, and travel funds is also provided.

Industrial participation, which has been mainly limited to the submission of compounds, will be expanded through contracts made possible by recent congressional appropriation, Endicott reported. Firms will undertake research and development projects as well as "target" or applied programs. Work will cover inplant screening, syntheses of potential anticancer agents, pharmacology, methodology, and other phases of drug development.

Evidence that the clinical course of cancer can be influenced by chemicals has aroused the interest and support of the pharmaceutical industry, research organizations, private

investigators, and the Government. The cooperation of these groups makes possible a continuous, concerted effort toward the chemical control of cancer, Endicott concluded.

Anticancer Agents Tested As Surgery Adjuvant

The efficacy of anticancer agents as an adjuvant to excisional surgery is on trial at a group of university surgery departments and a group of veterans hospitals.

These closely supervised studies, organized in November 1956 under the auspices of the Clinical Panel of the Cancer Chemotherapy National Service Center, were described by Dr. George E. Moore, director of the Roswell Park Memorial Institute, Buffalo, N. Y.

Surgery, even when all gross evidence of the tumor is removed, and irradiation of the operative area do not cure all patients, Moore said. He pointed out that free tumor cells may spread through the lymphatic and vascular systems, or they may exfoliate into a body cavity. About half of the blood samples obtained from veins draining malignancies of the lung and gastric intestinal tract contain tumor cells, he reported.

Moore termed logical an attempt to destroy by chemical compounds the widespread cancer cells remaining after surgery since the majority of patients die from metastasis of the cancerous cells rather than from local recurrence.

In experimental work, he reported, chemotherapeutic agents have been effective against unestablished tumors, although they were ineffective in curing the same type of established tumors.

Highly Toxic

Moore warned, however, that adjuvant chemotherapy has not been established and is not recommended for general use. With few exceptions, all compounds active against tumors are extremely toxic when

BRAIN TUMORS

given in effective dosages, he said. The cooperative studies, Moore advised, should yield valid information in the shortest possible time with the least possible risk to patients.

In the first studies, cancers of poor prognosis were selected for observation. The parallel investigations at a large number of hospitals were planned to insure an adequate number of study patients within a 1-year period.

Triethylenethiophosphoramide (TSPA) is under test in conjunction with surgery for carcinoma of the stomach in one study. A second study concerns the use of nitrogen mustard in patients with resectable lung cancer.

Under consideration are studies of colon and rectal carcinoma and breast cancer, using TSPA, and cancer of the ovary, using an alkylating agent or radioactive isotope.

Study Protocol

Moore outlined as representative the protocol of the gastric cancer study, followed in the separate investigations by the various hospitals. Patients with nonresectable lesions or physical conditions that indicate increased risk to chemotherapy are excluded. Eligible patients are assigned by random selection to experimental and control groups, with the assignment unknown to the surgeon until after completion of the excision.

At surgery the scheduled dosage is administered into the systemic vein and into the peritoneal cavity before closing the abdomen. Post-operative dosages are given intravenously on the 1st and 2d days.

Followup examinations are designed to obtain immediate information on the effect of the chemotherapeutic agent upon the blood-forming system and to yield subsequent information on survival. Survival was adopted as the only criterion of effectiveness.

Moore stressed the importance of the central statistical unit, which must provide the randomization techniques, index patients admitted to the study, check on the accuracy

of the data gathered, verify survival periods, and, finally, assess the value of the therapy.

Final assessment of Triethylenethiophosphoramide as an adjuvant agent against carcinoma of the stomach should be possible within 2 years after completion of the study, Moore said.

Environment Holds Brain Tumor Clue

The first study on the epidemiology of tumors of the central nervous system showed that an environmental factor may be associated with these tumors, according to Dr. Thomas F. Mancuso, chief, division of industrial hygiene, and Dr. Elizabeth Jackson Coulter, chief statistician, division of vital statistics, Ohio Department of Health.

The authors, using data on residents of Ohio, 25 to 64 years of age, who died of tumors of the central nervous system during the period from 1944 to 1952, found variations according to geographic location, population group, and industry. Death certificates, histological examinations, X-rays, angiograms, and ventriculograms were the sources of their data.

High Urban Rate

Data on residence of white males showed that the 8 metropolitan counties had a standardized mortality ratio of 110.1, that 7 urban counties had a 97.3 ratio, and that the remaining 73 rural counties had an 84.4 ratio compared with the whole State. Counties were classified as metropolitan if they had cities of 100,000 or more; as urban if they had 50,000 or more persons living in urban areas.

In Summit County, Ohio, deaths of white men due to brain tumors were significantly higher than expected on the basis of mortality experience in the State—77 compared with 53.8. For white men, Summit County's average annual

age-adjusted rate, 8.06, was the highest among Ohio's 8 metropolitan counties, whose total rate was 6.26.

The metropolitan counties had 602 deaths due to tumors of the central nervous system among white men, and 415 among white women of the same age group during the 1944 to 1952 period.

These counties, the authors also found, had a higher average annual mortality rate per 100,000 for men than for women. The age-adjusted rate for the counties for men was 6.26 compared with 4.22 for women. In each county the rate for men exceeded that for women.

Mancuso and Coulter compared average annual death rates per 100,000 for native white, foreign born white, and nonwhite males. The age-adjusted rate for foreign born was 5.89, for native white 4.25, and for nonwhite, 3.17.

Data on length of residence in the metropolitan counties at the time of death showed 45 of 81 foreign born white males and 215 of 367 native white males died after 20 or more years of residence.

Industry as a Factor

Variations by industry and length of employment were also factors in deaths from brain tumors, the authors reported. Their statewide data covered 934 white males who died of tumors of the central nervous system in the period 1944-52. The employment histories of each death were reviewed to determine the industry in which the person worked in 1939, by age at that time.

In addition, the period of employment in the industry recorded in 1939 was determined. Industry rates of employment in 1939 were computed on the basis of population data in the 1940 U. S. census and adjusted for age on the basis of the total population of continental United States.

Deaths due to tumors of the central nervous system were identified in three major industry groups of agriculture, construction, and manufacturing. Within the manufactur-

ing group approximately 10 specific industries were studied. The result showed considerable variation in rates. The lowest rate for the three broad industrial groups occurred in agriculture. Several specific manufacturing industries, on the other hand, showed relatively high mortality.

On the basis of their data, Mancuso and Coulter concluded that exploration of environmental factors may provide clues to the etiology of tumors of the central nervous system.

Finds Ethnic Extremes In Cervical Cancer

Cancer of the uterine cervix is nearly four times as common among non-Jewish white women of New York City as in Jewish women of either New York or Israel.

Incidence rates are consistently low for cancer of the cervix—4.8 per 100,000—among Jewish women in both areas although habits, customs, and geographic origins of the two groups are not identical. By contrast, the rate for non-Jewish white women in New York City is 17.3, and it is 39.1 for selected urban areas in the United States.

These findings were reported by Dr. Lucia J. Dunham of the Laboratory of Pathology, National Cancer Institute, from studies pursued with Dr. Harold F. Dorn, chief, Biometrics Branch, National Institutes of Health.

Cervical cancer seems to be a frequent form of malignancy in Puerto Rican and nonwhite women, according to Dunham and Dorn. The incidence for Puerto Rican women was 111.3 per 100,000 while the rate for nonwhite women was 54.5 per 100,000 in the groups studied in New York City.

Individual interviews of patients were conducted to obtain information on social, medical, surgical, menstrual, marital, and pregnancy histories. A total of 3,514 women, including 2,418 Jewish women and

1,096 non-Jewish white women, were interviewed between 1951 and 1953 in New York City and Israel. Fewer than half of them had cancer. The remainder were hospital patients without cancer, interviewed as control cases.

Durnham and Dorn emphasized that this is a preliminary report on the methods used in a study of women with uterine cancers in different geographic areas and racial groups. "We hope a scientific basis will be established for the study of factors which may shed light on reasons for differences in cancers of the uterine cervix in several population groups," they said.

Cytological Facilities For Cervical Lesions

A widespread deployment of cytological diagnostic facilities would be of invaluable assistance in the early detection and treatment of cervical lesions, presumed to be a preinvasive form of cancer. Of equal importance, these facilities would enable us to arrive at an understanding of the biology of cervical carcinoma and its epidemiology.

These were the main contentions of Dr. John K. Frost, assistant professor of gynecology, Johns Hopkins School of Medicine, and associate professor of pathology, University of Maryland School of Medicine, Baltimore.

Through the use of exfoliative cytology, he said, the preinvasive form of cervical cancer has been detected in 97 percent of the women in whom it is known to occur. This may be contrasted with the disappointingly infrequent detections by physical examination alone.

Cytological detection of these lesions of carcinoma-in-situ, has resulted in early treatment, which Frost believes has contributed increasingly to the conservation of life.

But there is still some distance to go, Frost observed, before the biological behavior of cervical lesions

is completely understood. Establishing adequate cytological diagnostic facilities would shorten that distance considerably.

Rheumatic Fever Cases Exceed Morbidity Reports

A study of rheumatic fever prevalence in Minnesota showed that 2,600 cases were diagnosed and treated in 1955, although 187 cases is the State's yearly reported average (1950-54).

Reporting of the disease is required by law, but such reporting is known to be incomplete, stated Dr. A. B. Rosenfield, director, division of special services, Minnesota Department of Health, who made the study.

To obtain accurate information on prevalence, Minnesota's Heart Association, the State Department of Health, and the Heart Committee of the State Medical Association sent questionnaires to 3,063 State Medical Association members in September 1955.

In 1,519 replies, 597 physicians reported 2,297 cases over 12 months, averaging 3.8 cases per physician reporting cases.

The large number of cases reported in the survey and the small number reported to the State health department raised two questions, Rosenfield declared. How many of the 2,297 cases were actually identifiable? How many met accepted diagnostic criteria for rheumatic fever?

Physicians Interviewed

To find the answers, 65 physicians (11 percent) who reported 13 percent of the cases in the survey and 240 physicians (16 percent) who did not return questionnaires were interviewed. Case records were also reviewed and data abstracted on a checklist of Jones' criteria for diagnosis of rheumatic fever.

Interview data from 65 physicians who returned questionnaires showed:

281 cases of rheumatic fever were reported.

RHEUMATIC FEVER

225 cases were identified as actual cases through records or interview.

202 cases qualified under Jones' diagnostic criteria.

113 cases were in females, 112 in males.

152 cases were in children under 15 years of age.

41 of the physicians were general practitioners, 15 internists, 7 pediatricians, and 2 surgeons.

Interview data from 240 physicians who did not return questionnaires showed:

74 physicians treated 177 cases of rheumatic fever.

158 cases qualified as actual cases under Jones' diagnostic criteria.

65 cases were in females, 112 in males.

114 cases were in children under 15 years of age.

105 of the physicians were general practitioners, 30 surgeons, 28 internists, 10 pediatricians, and 67 others eye, ear, nose and throat specialists, dermatologists, psychiatrists, urologists, orthopedic surgeons, obstetricians, gynecologists, or radiologists.

Reports from the two groups of physicians showed differences in percentages of cases meeting Jones' major and minor criteria for rheumatic fever.

But in the reporting group 52 percent of the cases met 2 major criteria, and 38 percent met 1 major and 2 minor criteria. In the nonreporting group 45 percent of the cases met 2 major criteria, and the same percentage met 1 major and 2 minor criteria. Under Jones' criteria 90 percent of the cases in both groups qualified as rheumatic fever.

In both groups general practitioners diagnosed and treated 75 percent of the cases and internists and pediatricians 20 percent. Two-thirds of all cases of rheumatic fever occurred in children under 15 years.

Conclusions

The followup studies, statistically designed to confirm or revise the

2,297 cases originally reported in the survey, proved to Rosenfield that 1,650 cases were actually treated by the entire group of physicians returning questionnaires.

The interviews with the 240 physicians who had not returned questionnaires showed 74, or 30.8 percent, had treated rheumatic fever, while 597, or 39.3 percent of those replying in the survey, reported cases. This indicated the 1,507 non-repliers in the original survey treated approximately 1,000 cases.

Rosenfield concluded that Minnesota had 2,600 cases of rheumatic fever in 1955, that the disease continues to be prevalent in the State, and that it constitutes a serious hazard.

Recurrence Rates Decline For Rheumatic Fever

Rheumatic fever recurrence rates in patients aged 2-20 years showed a decline during a 21-year study, 1936-56, conducted at the New York Hospital cardiac rheumatic clinic.

According to Dr. May G. Wilson, Dr. Wan Ngo Lim, and Dr. Ann McA. Birch, all pediatricians with the Cornell University Medical College, the decline appeared to coincide with progressive improvement in socioeconomic status for the observed patients.

The downward trend in recurrence rates antedated the antimicrobial era and did not appear to be sharper

for 1952-56 when antibiotics were administered either therapeutically or prophylactically, the authors stated.

During the study period 782 children, who contributed 5,663 person-years, had a total of 613 recurrences, giving a crude overall rate of 10.8 percent per year. Twenty-one consecutive annual recurrence rates at ages 2 to 20 years gave a mean rate of 9.8 percent per year. There was a statistically significant downward trend, with a slope of -0.4 percent per year, in the annual recurrence rates from 1937 to 1956. The individual rates for 1936-41 were significantly above the mean rate, and significantly below for 1955-56.

The approximate chance of a recurrence in any one year for all children 6 to 13 years of age declined from 1 in 4 before 1944 to 1 in 7 between 1944 and 1956. For those aged 14 to 20 years the chances fell from 1 in 16 to 1 in 35.

General improvement in the standard of living in Greater New York City during the years 1936-56 was reflected in the socioeconomic composition of the clinic population, the authors stated. They explained that the relative percentage of patients in the best environmental group increased, and those in the poorest socioeconomic status decreased. Recurrence rates were generally lower in the more favorable environmental group, and for the poorest environmental group the rates did not follow the decline noted for the total clinic population.

Dental Health . . .

Fluoridation System Devised for Home Use

Users of private water supplies may soon be able to enjoy the benefits of fluoridated drinking water, according to statements by F. J. Maier, sanitary engineer, Division of Dental Public Health, Public Health Service.

For the past 2 years, a device for fluoridating individual water systems has been in use in four suburban homes in Maryland. Fluoridation has been accomplished with the utmost safety and with remarkable consistency and precision, the report indicated.

Indispensable to satisfactory operation of home fluoridation equip-

ment is proper maintenance, Maier said. A service to provide fluoridated water similar to services now providing chlorinated water, softened water, or bottled water was recommended as a practical and profitable enterprise.

The tasks of a fluoridation service would include analysis of the untreated water; provision, installation, and maintenance of equipment; periodic inspection of the installation, replenishment of the fluoride solution, and adjustment of the dosage; and eventually removal of the equipment.

The cost for the service, including a \$1.50 profit, is estimated to be \$3.00 per month. It could be less, depending on the number of customers, distances traveled in servicing the equipment, and the like.

So far fluoride-feeding devices are available only for homes with electrically driven pumps which discharge into a pressure tank, but devices can be developed for other types of private water supply systems.

In the Maryland experiment, two types of feeders have been tried. One is actuated by a solenoid which is energized periodically through a rectifier by means of an electric timer. The other is hydraulically operated, the driving energy being derived from the water pressure in the distribution system.

These two types, both commercially available, appear to be equally accurate, but the hydraulic model seems to operate more smoothly, according to Maier. With the hydraulic model, he pointed out, there is no possibility of operation when the pump switch is on but no water is being delivered.

During most of the testing period, the units were serviced each month, although replenishment of fluoride solution was not required for about 3 months. Minor repairs, such as replacement of fuses, repair of leaks, or replacement of plastic parts, had to be made occasionally. These affected the continuity of feeding, but they did not affect at all the

safety of the procedure from the standpoint of overdosing.

Maier estimates that currently about 20 million homes housing 60 million people have private, individual water sources, and he believes the proportion is increasing slightly each year.

Topical application of fluorides, use of bottled fluoride water, and use of pills containing fluoride are among the methods suggested for bringing the benefits of fluoride to these people. But these methods, according to Maier, are expensive, difficult to administer, or hazardous in comparison with fluoridation of the water supply.

All known experience and information indicate that fluoridation of the existing water supply is the best method from the standpoint of both safety and effectiveness.

Precision in Fluoridation Judged a Necessity

Maximum benefit to teeth from fluoride depends on maintenance of the fluoride content of the water supply at the established optimal level, declared Grace C. Scholz and Floyd B. Taylor, of the Public Health Service, and W. L. Harris, water plant supervisor in Grand Rapids, Mich. Miss Scholz is chief of statistical services, Division of Dental Public Health, and Mr. Taylor is sanitary engineer, Division of Sanitary Engineering Services.

Reporting a study which revealed that two cities failed to keep the fluoride content up to the desired level, they urged periodic, current determinations of fluoride content and immediate correction of deficiencies. They recommended simple statistical analysis of series of water test results, preferably at intervals not exceeding 3 months.

Fluoridation as a public health measure will not be judged by the maximum results that a properly conducted study can effect but by its actual achievement in preventing dental caries in all communities where it is practiced, they warned.

It was observed that State health departments frequently establish recommended levels of fluoride concentration and a maximum level that is never to be exceeded, but that little concern is evidenced when fluoride concentrations fall below the recommended level.

The study was conducted in two unidentified cities in the east and in Grand Rapids, Mich. It was based on water sample analyses performed and recorded as part of normal plant operations.

Grand Rapids achieved remarkable precision in meeting the objective of 1.0 to 1.1 p.p.m. fluoride. In clear-well samples, the mean fluoride content during a 10-year period was 1.07 p.p.m., with a standard deviation of only 0.06 p.p.m. Findings for samples from the distribution system during the same period were comparable.

The two eastern cities, however, fell far below their fluoridation aim. In one the mean for samples from the distribution system collected during a period of more than 2 years was 0.62 p.p.m. with a standard deviation of 0.23 p.p.m. This city ceased fluoridation by action of the governing council following suspension of the procedure by the water superintendent.

In the other eastern city, the mean for distribution system samples was 0.66 p.p.m., and the standard deviation was 0.41 p.p.m., indicating a wide variation in the readings. Samples collected at the pumping station during a portion of the same period showed a mean of 0.76 p.p.m. and a standard deviation of 0.32.

Officials in this latter city introduced corrective measures, and a subsequent 6-month series of samples showed improvement. The mean was 0.88 p.p.m. with a standard deviation of 0.26 p.p.m.

It was noted that the fluoridation experience of the two eastern cities is not unique.

Fluoridation procedure presents no unusual technical difficulties, the report stated, but it requires that the water plant operator exercise the

DENTAL PERSONNEL

same kind of care he customarily applies to other water treatment processes.

Accuracy in fluoride feeding may be difficult in some instances, but it is never impossible.

Major direct responsibility for surveillance of the fluoridation process belongs to the health department engineer. Dentists, however, are indirectly accountable, the report pointed out. They have predicted and promised benefits. Their indifference to the necessity of maintaining a precise fluoride level could bring them discredit should fluoridation be condemned because inadequate procedures produced inadequate results.

Responsibilities for Dental Hygienists

Increased responsibilities would attract more dental hygienists to public health service, commented Martha Howard Fales, dental health coordinator, Brookline, Mass.

The primary reason for the shortage of dental hygienists, Fales maintained, is that few are given the opportunity to use their capacities to the full, with the result that their work seems unattractive.

Recruitments, Fales said, are not replacing those lost through death or retirement. As a result, more and more public health dentists have had to undertake duties normally performed by the hygienist.

Responsibilities, Fales observed, may be added to the dental hygienist's role according to the level of competency. There are three such levels: the certificate dental hygienist, the dental hygienist with a bachelor's degree, and the dental hygienist with graduate training in public health. Fales suggested the following responsibilities that could be assigned to each level of competency.

Certificate Dental Hygienist

Educate patients, particularly children, in dental procedures and dental health facts.

Educate patients in the requirements and routines of the clinic.

Screen clinic cases from referrals to private dentists.

Conduct community dental surveys.

Take roentgenograms for community surveys or for research studies as well as in the clinic.

Do all prophylactic work for clinic patients or for demonstration programs.

Make topical fluoride applications.

Make occlusal evaluations, code findings, and make models.

Take charge of clinic supplies, and inform staff of availability of new materials.

Degree Dental Hygienist

Screen patients; record and interpret findings for others.

Compile data on clinic functions and activities for the director.

Undertake major load of school dental health programs.

Provide and interpret information for local groups.

Act with or for the director in planning community projects.

Work with welfare, volunteer, and veterans' groups.

Lecture before training schools and supervise field training experience.

Graduate Dental Hygienist

Administer town or county dental programs, coordinating the work of advisory dental committees with dental clinic programs.

Participate in program planning and evaluation.

Recruit for staff openings.

Train new personnel.

Help prepare annual reports and budget.

Arrange field training visits and institutes.

Work with dental hygiene training schools and teacher training colleges.

Urges States to Meet Dental Deficiencies

The inadequate supply of dentists and dental hygienists makes it man-

datory for State health agencies to play a larger role in dental health activities than they have up to now, commented Dr. Wesley O. Young, director, division of dental health, Idaho State Board of Health.

State health agencies, Young said, must stimulate interest and action, coordinate joint cooperative action on State, regional, and national levels and serve as a source of technical information.

Since the basic objective of public dental health is to improve the oral health of the public through community activities, it is imperative, Young asserted, that the supply of dental personnel be increased and the available resources be fully utilized in order to meet that objective.

Various attempts, Young noted, have been made to meet the widespread lack of dental manpower. Fluoridation and emphasis on child dental care are two activities undertaken to reduce anticipated patient loads. In the western States, to which Young turned for his examples, expansion of present facilities, reorganization of various units, and creation of new methods have been the principal activities in meeting the problems of dental manpower shortages.

In Colorado, Young said, the new dental school being built there will be, through the efforts of the State dental society, regional in character and will serve the entire Rocky Mountain area. In Idaho, the State dental society has provided scholarships for students of dental hygiene, and plans have been developed to expand one of the universities to include a dental hygiene school. This school will offer courses leading to a certificate or a degree in dental hygiene. In Nevada, the uneven distribution of its population resulted in inadequate dental care in sparsely populated regions. To serve these relatively isolated areas, the State dental society purchased a fully equipped dental trailer.

In order to provide adequate dental manpower, four basic steps must be taken, Young said: (a) de-

termine present and future needs; (b) organize new facilities or expand existing ones if supply will not meet expected demand; (c) utilize present and contemplated educational facilities to meet State and regional needs; and (d) promote an equitable distribution of dental personnel to serve an equal number of patients.

Nation's Dentist Shortage Estimated at 13,500

The number of dentists in the United States has become progressively disproportionate to public needs during the past 27 years, reported Dr. Quentin M. Smith, assistant chief, Division of Dental Resources, Public Health Service.

Within the same period, he added, the public's appreciation of good dental care, and the ability to afford it, have increased substantially.

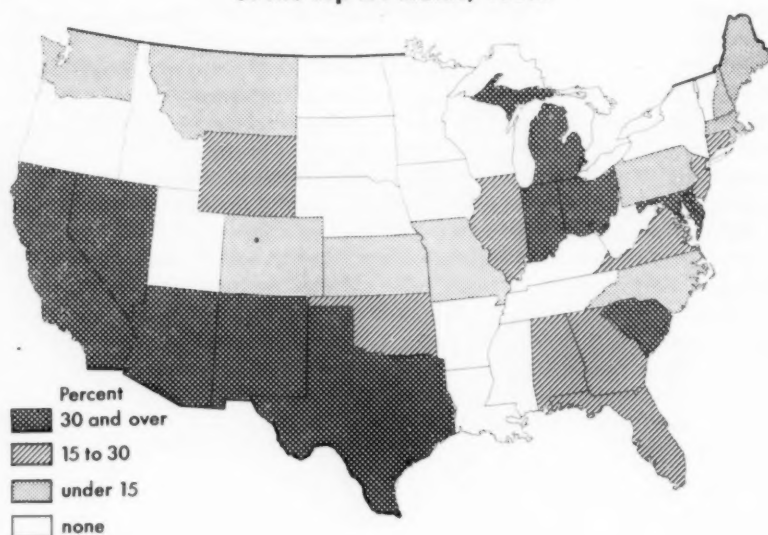
Estimating the current shortage of dentists in the United States at 13,500, with California and States in the Great Lakes and southwest regions showing acute shortages, Smith pointed out a need to expand dental training facilities if the Nation's oral health is to be protected.

Calculating Needs

In 1940, Smith reported, there was a ratio of \$2.2 million of personal income to every dentist; in 1955, there was one dentist to every \$4 million. Thus, "when before the war we had 2 dentists, today we have only 1 in relation to the same amount of purchasing power."

The fact that there is twice as much money available, however, does not necessarily mean that twice as many dentists could be used, Smith said, since competition for the consumer's dollar has increased. For this reason, in order to find a basis for calculating the need for dentists a 1955 average was taken of all States, creating thereby a hypothetical State having one dentist per \$4.3 million personal income. This value,

Percent increase needed in dentist supply to meet demand level of the top 24 States, 1955.



after proper weighting by an index of population characteristics known to affect demand for dentists' services, was taken as representing an average level of "effective demand" for dentists.

An average of the 24 States having the largest number of dentists in relation to income (1 per \$3.6 million), weighted in the same manner, defined a second, more optimum level of effective demand. Using these two values as standards, Smith said dentist requirements at either level of effective demand can be calculated for any State or area for which information on income and population characteristics is available.

Taking into account all factors, "we would need about 6,000 additional dentists to provide every region with a dentist supply big enough to meet the demand level being met in the average State today, and it would take nearly 13,500 additional dentists to meet the demands equivalent to those being met in the top 24 States."

The regions needing the largest numbers of dentists are, in order, Great Lakes, far west, Middle Atlantic, and southwest (see map). In addition, one State located outside these regions—South Carolina—has a particularly urgent need for dentists.

Records and Measurements . . .

Improved Records Systems Seen Crucial Need

More than 40 years ago Dr. Charles V. Chapin of the Public Health Service pointed out that the absence of readily available facts was responsible for the lack of system in public health programs and

procedures. Yet today, reporting and recording systems are still inadequate, according to Nancy W. Lucas, supervisor, records consulting unit, division of vital statistics, Ohio Department of Health, Columbus.

Application of principles and techniques of office methods and records management to public health rec-

ADMINISTRATIVE EVALUATION

ords, recruitment and utilization of personnel with special competence in records work, increased understanding and support of records work by administrators, and expansion of training facilities specifically designed for public health records personnel are some of the steps needed to improve health department reports and records, Lucas stated.

Records Systems

Each element of a records system must be selected for its contribution to the whole because a breakdown in any one element will affect the functioning of the entire system. According to Lucas, obsolete procedures, lack of attention to schedules for the disposition and retention of records, and delay in the progression of records from point of origin to final filing are some of the problems of records systems.

Lucid, concise, up-to-date procedures manuals are essential to the effective use of record forms, Lucas said. A reviewing body should correlate the forms used by various programs and disciplines in the health department in order to avoid unnecessary multiplication, to assure consistency in format, and to make sure that the size of the forms conforms to that of the filing equipment in the department. Before introducing a new form into a records system, revising or combining existing forms or changing procedures should be considered.

Records Management

Office management implies the planning, organization, and control of office activities but in the health department the activities often control the office, Lucas stated.

Perhaps the greatest handicap to good records work is lack of interest in and support of good office methods and records management on the part of administrators, health officers, and program directors, Lucas asserted. Administrators frequently fail to make it clear to the staff that authority for certain operations has been delegated to the records clerk. They also sometimes allow

inefficient procedures to continue because they do not see the need for change and do not give authority to anyone else to make changes in routine procedures.

Although the records clerk has the principal responsibility for records, each member of the health department staff has some kind of records work to do. In local health departments, where the clerk's multiplicity of duties leaves insufficient time for records work, the burden of handling records falls on nurses and sanitarians, whose training and interests lie in other directions.

Filing is one of the most important areas in a records system, Lucas stated. Also, she pointed out, because of the many sources and types of information about each patient who comes to the attention of a health department, it is one of the areas of greatest confusion. To prevent misfiling and misplacing records, she suggested that one person be delegated to do all filing and refiling.

Lucas recommended unit filing by person, place, or family whenever possible. However, in large health departments, numerical systems have been found to be a satisfactory method. In departments which do not have a large volume of records, alphabetical systems are more practical.

Personnel and Training

Too few clerical personnel and employment of persons with insufficient skill and training in elementary office techniques hamper records work in health departments and make it necessary for other personnel to spend too high a proportion of their time on records, Lucas stated. Public health administrators have little training in the principles and practices of office management; physicians, nurses, and sanitarians are not expected to be competent in this field; and personnel with sufficient training are not attracted by the status or salary of the clerical position offered, she said.

There are practically no formal training courses for public health

records personnel, and inservice training courses provide little appreciation of the importance of integrating records with the work of the entire health department or of the significance of records procedures, Lucas reported.

Training courses for records personnel are urgently needed, she concluded. These courses should include instruction in office management, analysis of office methods, design and control of forms, filing methods and equipment, writing procedures, and coordination and utilization of data, she said.

Laboratory Activities Need Evaluation Aids

Properly prepared evaluation indexes help administrators measure the effectiveness of their programs and help win support for their budget requests, said Dr. Daniel Bergsma, New Jersey State Commissioner of Health.

The most potent evaluation procedure, he suggested, is a well-designed method of recording public health activities; for no program can be efficiently applied or evaluated unless it is recorded.

The evaluation indexes of the chemistry laboratory program of the New Jersey Department of Health covered scope, personnel, methodology, equipment, quarters, location, samples, and records. These indexes, according to Dr. Bergsma, were designed "to emphasize accomplishment rather than effort and to stress quality more than quantity."

Evaluating laboratory procedures, Bergsma said, must be viewed within the context of certain variables: the excess or lack of trained personnel in relation to the job to be done; the availability of adequate tools and facilities; the maintenance of balance between advanced training and new needs; and the preservation of balanced relationships with those who are served.

The criteria of these variables, he pointed out, might become com-

pletely subjective unless objective measuring tools can be devised and applied. This does not imply that evaluation teams must be used; he found from his own experience that self-evaluation achieves adequate objectivity without consuming the time of an evaluation team.

There is a need at present, Bergsma concluded, to find proper evaluation indexes to measure both quality and quantity of laboratory activities, and to find means of applying these indexes to State operated laboratories or those working under the approval of the State department of health.

Hospital Records Supply Information to Physicians

Much useful information, some of it of real value to the practicing physician, is available in hospital records, stated Dr. Robert C. Hoffmann, of the J. Hillis Miller Health Center, University of Florida, Gainesville, Fla.

However, although a great deal of information can be extracted from hospital records at reasonable cost by the use of mechanical devices, physicians need training and statistical guidance to enable them to use this information, Hoffmann declared.

Most practicing physicians make little use of hospital records, Hoffmann reported. They complete the records with effort, file them, and, except for clinical use of records of patients admitted to the hospital more than once, seldom use the records again. Perhaps this is because the information in hospital records is not easily accessible and few physicians have enough statistical training to appreciate the value of the information in them, Hoffmann suggested.

Potential Uses of Records

All physicians are interested in information which summarizes their own hospital practice and provides information with which they can compare their own practices and those of their colleagues, Hoffmann

said. Properly summarized records can give the physician a picture of the changes in the prevalence of hospitalization and in the incidence of disease and of the popularity of certain surgical procedures. In this connection, a practicing physician might ask his hospital for a periodic summary on his own patients and for summaries on all patients in the hospital.

The hospital record provides information on current practices and makes it possible to compare these practices with the results of research, Hoffmann pointed out. For example, in a recent study of records of patients hospitalized for coronary disease, it was found that treatment with anticoagulants had been given to only two-thirds of those who probably could have been benefited by this treatment.

Hospital records also make it possible for physicians to acquire information on a new treatment being used by their fellow practitioners, Hoffmann stated. A pool of information such as can be found in hospital records will increase the rapidity with which the effectiveness of the new treatment can be established. Hoffmann recommended that this use of hospital records be expanded. Furthermore, he said, in cooperative studies conducted in two or more hospitals, patients' records can provide data much more rapidly than can a study in a single hospital.

Hoffmann said that, with punch-card equipment and electronic machines for handling data, it is not difficult to abstract information from hospital records. The only limitations are the amount of information in the records and the amount of money spent.

Statistical Training of Physicians

Much more difficult than setting up an abstracting system is the problem of training physicians in the use of the abstracted information, Hoffmann stated. Such information cannot be used to the best advantage because many physicians are unfamiliar with statistical methodology, he said. However, since some

medical schools do not employ a statistician, in his opinion, few physicians can be expected to be familiar with statistical methods.

The responsibility for training physicians in basic statistics lies with statisticians and, as a professional group, they have done little to acquaint the members of other professions with the statistician's functions, Hoffmann stated.

In closing, he expressed concern about the role of the statistician in medicine and reported that a motion to seek joint meetings with medical organizations had been passed at the last meeting of the Eastern North American Region of the Biometric Society. Eventually, he said, a separate medical statistical organization probably should be established.

Study of Death Certificates Shows Diagnostic Difficulties

Complete and unfailing accuracy of antemortem diagnosis is unattainable, and insistence on absolute accuracy in the medical certification of causes of death is unreasonable. However, a study of diagnostic evidence available in support of recorded causes of death in Pennsylvania suggests that diagnostic data on which medical certifications are based are of a relatively high order of quality.

The study was conducted in cooperation with the Pennsylvania Department of Health for the purpose of determining the possibilities of developing measures of the quality of medical certifications of death and to ascertain the problems involved in the conduct of a study of this kind. The results were reported by Dr. Iwao Moriyama, of the National Office of Vital Statistics, and Dr. William S. Baum and William M. Haenszel, of the National Cancer Institute, Public Health Service.

The causes of death included in the study were tuberculosis, malign-

ANALYSIS OF DATA

nant neoplasms, with special reference to cancer of the respiratory system, diabetes, all cardiovascular-renal diseases, influenza and pneumonia, and cirrhosis of the liver.

A questionnaire was sent to each physician who had signed a death certificate, asking for information on diagnostic methods and findings on which the certification of cause of death was based, an expression of his certainty of the diagnosis, and a revised diagnosis if his opinion had changed since he signed the death certificate. Questionnaires were also sent to the physicians, if any, who had attended the patient before the certifying physician. Coroners and medical examiners were also queried.

An internist directed the review of the questionnaires and original death certificates for type and amount of supporting diagnostic information, consistency between medical certification and diagnostic information, and the physician's expression of his certainty of the diagnosis. Both clinical and pathological information were considered. The reviewer's own impression of the certainty of diagnosis was added to the information obtained from the questionnaires and death certificates.

Diagnostic Information

Apparently most deaths are certified by the general practitioner rather than by the specialist, and, except for deaths from cardiovascular-renal diseases, relatively few deaths from the causes studied are certified by coroners or medical examiners. However, these deaths from cardiovascular-renal diseases can significantly affect the statistics.

The kind and amount of diagnostic information reported as being available to the physician certifying the cause of death varied considerably, from sketchy information in 38 percent of the deaths to good or very good information in 58 percent. The quality of reported information on diagnostic methods was best for malignant neoplasms; diagnostic information was "very good" for 68 percent of deaths from this cause.

For the other diseases studied, quality varied considerably with the cause of death.

The ratings of consistency between the medical certification and the reported diagnostic information indicated that for 79 percent of the deaths, the reported causes of death were the most probable diagnoses. For the medicolegal cases, however, the percentage was only 61 percent. In the 5 percent of deaths for which the certifying physician changed his diagnosis, the reviewer usually agreed with the new diagnosis.

The reviewer's scores of the amount and kind of information reported, the reasonableness of the physician's diagnosis, and the reviewer's own opinion of the accuracy of the diagnosis reported were combined and the diagnoses were grouped into four categories—"solidly established," "reasonable," "in doubt," and "probably wrong." Diagnoses were apparently solidly established in 43 percent of the cases, reasonable in 36 percent, doubtful in 10 percent, and probably wrong in 8 percent. Four percent could not be evaluated because of lack of information.

The proportion of solidly established diagnoses is higher for male than for female decedents and for persons under 75 years of age than for those who are older. The lower quality of diagnostic data in the older age groups may be due to the fact that attempts to make a definite diagnosis would not be helpful to the patient or it may be due to the uncertainty of the certifying physician or the reviewer as to which of several diseases caused the death.

Recommendations

Discussion of the significance of the data available from death certificates in clinical or clinical-pathological conferences of the principal disciplines associated with each case would be helpful in future studies, but this approach would be feasible only for deaths in a single institution. However, interviews by an internist with persons who have some knowledge of the medical as-

pects of the case might supplement the questionnaires.

Future Offers Statisticians Opportunity and Challenge

The statistical phases of nuclear energy programs, epidemiological studies of diseases, and planning and evaluating the resources, needs, and costs of health and medical services offer the statistician outstanding opportunities and great challenges, declared Dr. Ruth R. Puffer, chief, epidemiology and statistics section, Pan American Sanitary Bureau, Washington, D. C.

Health Statistics

In nuclear energy programs, the services of the statistician can be used in measuring radiation exposure and its effect on man, in determining permissible exposure to radiation, and in developing statistical methods for analyzing data on human and experimental population genetics, Puffer stated. Some long-range studies in this field might cover several generations, she said.

Throughout the health field, the statistician assists the epidemiologist and administrator by providing epidemiological data for use in studying diseases and health conditions. According to Puffer, clinical and epidemiological studies of the major causes of disability and death and of cardiovascular diseases, cancer, and mental diseases require that a statistician be a member of the study team.

On a world basis, differences between countries in terminology and classification of causes of death result in tremendous differences in death rates from specific causes and in other data, Puffer said. As an example of the need for understanding medical terminology as used in various languages, she cited the use of the term "toxicosis." In nearly all Spanish-speaking countries, "toxicosis" means a specific clinical entity resulting from severe and rapid dehydration from diarrheal diseases.

The International List of Diseases and Causes of Death assigns toxico-sis in children under 1 year of age to "ill-defined diseases peculiar to early infancy." In Chile, assigning toxico-sis to "diseases of early infancy" has resulted in high death rates from these diseases and low death rates from diarrheal diseases in infancy, Puffer stated.

Health Services

Puffer said that definitions and standards are needed in planning health and medical services and that the experience of statisticians concerned with morbidity studies, prepayment insurance programs, hospital statistics, and other phases of medical services is valuable in establishing national and international standards. She stressed the importance of the development of comparable statistical data on a world basis so that comparisons can be made of data in areas with varying environmental conditions.

Quality Control Urged For Mortality Data

Before mortality data can be accurately used for epidemiological research, a means of measuring the biases of the data must be developed, according to Dr. Tom Donnelly, School of Public Health, University of North Carolina.

"Epidemiology," he said, "has reached the state where the analytical tools it uses are more powerful than the accuracy of its raw data would warrant, at least when these raw data come from published vital statistics."

Donnelly, pointing up analytical difficulties involved with mortality data on heart disease, said that almost all measurable social factors are associated with heart disease. But no single measurement can describe the separate effect of any factor because each factor interacts in its own particular way with the others. With so many factors operating, it is possible to "prove" any-

thing, Donnelly said, merely by selecting some factors and ignoring others.

Conclusions derived in this manner contain what might be called analytical biases. More basic, Donnelly said, are the statistical biases inherent in the mortality data. Biases or errors may occur from an improper classification of a disease resulting in under- or over-estimation of mortality, or they may occur from additions to or omissions from the bookkeeping system after the patient has died. In either case, no quality control system exists, Don-

nelly said, which can determine the magnitude of biases or errors in mortality data.

Donnelly urged that steps be taken to measure this magnitude. As the initial step, he suggested listing procedural aspects of collecting vital statistics that are subject to biases or errors, so that the cost of either measuring accurately or reducing errors and biases may be assessed.

It is not necessary, he emphasized, to eliminate biases; one need only measure them. Once they are measured, the statistician will be able to do accurate factorial analyses.

Maternal and Child Health . . .

Recommend Screening Child For Eye and Mental Health

Among 959 presumably well infants and preschool children examined in Minneapolis well-child conferences of 1957, about 37 percent were found to have at least one health problem, according to a study reported by Dr. Helen M. Wallace, Dr. Evelyn Hartman, Vernon Weckworth, and Dr. Eunice Davis of the University of Minnesota School of Public Health and the Minneapolis Health Department.

Studied by the University of Minnesota School of Public Health and the Minneapolis Health Department in April, and again through June and July, the conferences showed that the highest frequency of health problems occurred in children 49 to 60 months of age, in nonwhites, and in boys. In general, infants and younger preschool children had a lower frequency than the older preschool group.

The authors also found that 29 percent of the children had 1 health problem, 6.7 percent had 2, and 0.6 percent had 3. The most common conditions identified were skin and respiratory, with cardiovascular, orthopedic, genitourinary, allergy,

and nutritional problems appearing next in frequency; followed by eye, gastrointestinal, and ear conditions. Low percentages were reported for both dental and emotional irregularities, which the authors attributed to possible lack of interest of examining physicians. Individual conditions occurring most frequently were respiratory infection, diaper rash and other skin disturbances, and umbilical hernia.

Eight percent of the children had had an accident since the last visit, the greatest frequency occurring in age groups 13 to 20 months and 25 to 36 months, and among whites. Falls caused 69 percent of the mishaps, and burns and ingestion, 10.7 and 4.8, respectively.

Translating these data into indexes of community needs, the authors recommended that, for such common health conditions in infants and preschool children as cardiovascular, orthopedic, genitourinary, eye, and ear problems, diagnostic and treatment speciality services be set up. They added that the group responsible for child health supervision must accept some responsibility for spurring development of these services, whether in the official crippled children's agency, teaching hospital,

official health agency, or voluntary organization.

They also suggested, in reflection of low frequency reports for eye conditions and emotional disturbances, that visual screening be made part of health appraisal of school children and that physicians in the well-child conferences receive more intensive preservice and inservice training in mental health.

Another question raised was whether well-child conferences should set a definite policy on provision of treatment for skin, respiratory, allergy, nutritional, and gastrointestinal conditions, some of which are already being treated at the conferences. Such a plan, they reasoned, would integrate well-child supervision and treatment, eliminate delay in treatment, and lower the number of visits which a family has to make.

Study of the attendance pattern of the conference could stimulate further surveys, they said, offering a number of possible causes for the less than expected infant attendance and the dropoff after 36 months of age. Another field suggested for study was the preventive aspects of the most frequent mortality causes among postneonatal infants and preschool children—congenital malformation, accidents, and respiratory infections.

Early Prosthetics Stressed For Child Amputees

A prosthetic device applied at an early age becomes as much a part of the child as the shoe he wears, stated Dr. Carleton Dean, director of the Michigan Crippled Children's Commission. Child amputees who are nonwearers, he continued, run the danger of atrophy through disuse, contractures, ankylosis, or ancillary deformities.

Early fitting will lead the congenital and the traumatic amputee to his greatest potential of purposeful movements and motor patterns within the limitations of the prosthesis. For the congenital amputee

to achieve early developmental use, a medical evaluation and recommendation must be made during the first year of life, according to Dean.

Describing briefly Michigan's pioneer venture in child amputee services, Dean said that a preliminary survey of the State's child arm amputees revealed that 7 out of 8 were not wearing their prostheses, mainly because the devices were not functional. The commission then gleaned a register of child amputees from a list of crippled children in Michigan. In addition to determining caseload, this register assured accurate diagnostic evaluation and followup services, he said.

The pattern of the amputee program, as outlined by Dean, begins with examination of the child, evaluation, prescription, and therapy. Prosthesis fitting is followed by training, occupational therapy, and field service and clinical followup. Dean observed that results of training to overcome the physical handicap hinged largely on the degree of enthusiasm of the prosthetic team—orthopedists, therapists, nurses, prosthetists, and instructors. He attributed a large measure of the commission's success to the practice of followup supervision and guidance. Definite clinic appointments at regular intervals are made for the child's return visits, with postcard reminders sent out in advance each time. The reasons underlying broken appointments are investigated.

Dean made clear that child amputees from other States may be referred to the Michigan Area Amputee Center for treatment, by the appropriate official agency when such services are unavailable in the home State. The commission has received Federal funds to finance treatment of out-of-State child amputees.

Every State or area with a population of more than 2 million should have a child amputee center, but not more than one for each million persons, he said, since an insufficient number of patients will weaken the interest of the amputee team. He advised that such a center be set up in a city with a hospital or rehabili-

tation institution having such specialists as a pediatrician, internist, plastic surgeon, urologist, a physical and an occupational therapist, and a medical social worker. The limb shop would ideally be in or near the hospital and directed by a certified prosthetist.

Dean mentioned available courses for prosthetists at the University of California at Los Angeles and at New York University. For study of the management of child amputees, he announced that orthopedic surgeons and physical and occupational therapists may enroll in courses at the Michigan Area Amputee Center in Grand Rapids.

Breast Feeding Variations Reported in New York

The practice of breast feeding of infants is more common among higher than lower socioeconomic groups, according to a survey of 1,433 upstate New York mothers who had given birth under normal conditions 3 to 6 months before.

The project, which studied variations in childbearing and child-rearing health practices according to social class, was reported by Dr. Alfred Yankauer, director, bureau of maternal and child health, New York State Department of Health, Dr. Walter E. Boek, research anthropologist of the same department, and Dr. Edwin D. Lawson, assistant professor of psychology, State University of New York College for Teachers, Albany, N. Y.

Interviews were carried out by 490 specially trained college students in social science and nursing in 15 widely scattered rural areas, villages, and cities near the participating schools. Although the selected sample represented from 1 to 36 percent of the number of annual births in these areas, it was by chance similar in many ways to the universe of families having births in upstate New York. The authors pointed out, however, that representation from central cities was heavy and suburban areas were unrepresented.

For classifying into social groups, the Warner Index of Social Characteristics was used together with photographic guides to characterization of house type and dwelling area. The index, they explained, is based on the sum of scores for occupation, income source, house type, and dwelling area, weighted in the order given.

Other survey results mentioned were:

- One mother out of every three worked during her most recent pregnancy, with roughly the same distribution in each class.

- Among mothers in social class V (lowest), 26 percent had not sought postnatal care at the time of the interview, compared with 13 percent for all mothers.

- One out of four mothers had ever attempted breast feeding. It was most popular and was continued longest by social class I and II mothers, while the reverse was true of those in social class V.

They urged health authorities to consider drawing on the interest and manpower of college and university social science departments, pointing to the mutual benefits of experience and data from their projects.

Such a survey can measure the extent to which observed health practices meet generally recommended standards, they stated, adding that social class groupings may pinpoint one class as a program target, as in this study, in the question of postnatal care, and the distribution of specialist services.

Since the survey can be duplicated later, it can be used to evaluate the effectiveness of a public health program and measure progress in health practices, both generally and by class. A further suggestion was that, through this technique, health departments expand their function of morbidity and mortality reporting to include health practices and knowledge. Probing desired and expected health services of the community was another recommendation.

The authors concluded with the thought that measurements them-

selves have unpredictable values. Therefore, possible shifts in such factors as social class patterns of breast feeding of infants may have more meaning 10 years hence.

Navajo Child Health Level Mirrors Tribe Future

On the principle that the health of the school child is the key to the general health level of the community, Dr. John C. Cobb, of the Division of Indian Health, Public Health Service, Albuquerque, N. Mex., says that one may determine the design of public health activities and forecast the lines of tribal social and economic growth among the Navajos.

Health Record

Infant mortality is about 99 per 1,000 live births among the Navajos, a tribe of more than 80,000, living in widely scattered, small and crowded hogans. This rate, said Cobb, mirrors the fact that, for many Navajo mothers in labor, reaching the hospital means a wagon trip over more than 50 miles of sandtrack.

More than a third of Navajo school children so far examined have signs of active or healed trachoma. About a third are tuberculin positive on school entrance, one-half testing positive by age 16. The tuberculosis case rate is more than 600 per 100,000 population, Cobb remarked. Between 5 and 10 percent of the school children have chronic draining otitis media or perforated eardrums, with partial deafness. School children compose one-third of the total Navajo population.

As a background for this health record, Cobb recalled that the Navajos have contended with limited resources on the reservation, drought, a ban on sheep grazing to stem erosion, and lack of water, combined with a tenfold growth in population in less than 90 years.

School Child Health Index

Those planning public health activities for the Navajo tribe face

the challenge of doubtful statistics, Cobb said. Cultural taboos against mention of death, for example, and recording in overcrowded clinics hinder accurate reporting. Statistics for the large school population, on the other hand, are readily accessible. Cobb proposed setting up an index of the percentage of children in a selected grade who are in good health. This, in effect, is a yardstick for measuring the end results of maternal and child health programs. He then submitted a list of conditions tentatively defining the child's good health.

Cobb believes that, in addition to local uses for the index, it can be used to compare the health of school children in various parts of the world and can pinpoint the targets for technical assistance in public health.

Pediatric Professor's Own Mutual Aid Program

The advantages of having an associate professor of pediatrics serve as pediatric consultant in a State health agency were described by Dr. John A. Lichty of the University of Colorado Medical School, who has received such an assignment with the Colorado State Department of Public Health.

University pediatric departments, Lichty said, can consider public health questions in hospital nurseries, communities, or in the entire State to be like individual clinical cases in the instruction of medical students. As in clinical medicine, he pointed out, the use of actual cases sharpens the effect of teaching.

Illustrating the public or community case, Lichty cited results of a neonatal mortality study in Colorado. The survey effectively demonstrated to the students the importance of improving care of the newborn and provided substance for discussions of possible factors in neonatal mortality.

Experience in a health department, in contrast to pediatric textbooks,

offers considerable guidance in teaching how to organize a school health program, he said. Many practical points emerge, for example, in the cooperative planning that helps the school complement, rather than interfere with, the family-physician relationship. By participating in such planning, Lichty noted, future physicians can learn while they perform a local service. Denver physicians in charge of school health present cases at the medical school each year.

To show the effectiveness of routine active immunization of children, the university pediatrics department compares the morbidity and mortality statistics on diphtheria and pertussis of the State before and after such immunization. Among other teaching material, Lichty mentioned a study showing the need for more cooperation of physicians and parents in immunizing infants, a study of heart disease in Colorado's sixth-grade school children, and another of the State's mortality from appendicitis.

According to Lichty, a prime teaching benefit derives from Colorado's premature infant service. The department sends premature infants directly to the university hospital and pays for a large part of their care.

Health department personnel are in constant touch with developments in the supervision of the newborn nursery of the university hospital, a contact reflected in the department's official plans and rules for nursery operations. Routine inspections of community hospitals are rather guidance sessions than "police actions," he said. Often, department officials suggest that medical school professors give short refresher courses in community hospitals to clear up trouble spots.

Lichty believes that leaders of State and county medical societies are more prone to approve public health suggestions that have the support of a responsible university faculty member.

Any public health activity for children can benefit from this dual

function, Lichty said, adding that the consultant himself, through constant intellectual bombardment, derives the greatest personal benefit.

Custom-Made Plans Urged For Developing Areas

"Only the scientific principles of Western public health practice are universally applicable, not program patterns," stated Dr. Jessie M. Bierman of the School of Public Health, University of California, in a review of World Health Organization-United Nations Children's Fund activities in maternal and child health in developing countries. Prefabricated Western-type programs need re-orienting toward local needs and resources, she said.

Epidemiological methods from the West, however, as well as the problem-centered approach can be transferred to these areas. In this connection, Bierman emphasized the need for more local morbidity and mortality data and for studies of the growth and development patterns of children, feeding practices, and beliefs and traditions concerning childbearing and child rearing. She also recommended study of the influence of socioeconomic and cultural factors

on the patterns of disease and on the workability of health measures, noting that most health problems in underdeveloped areas stem, rather than from exotic tropical diseases, from inadequate sewerage systems, squalid, overcrowded housing, and contaminated, meager water supplies.

The scope of maternal and child health programs needs broadening, she said, to embrace general health needs of mothers as well as special needs centering on reproductive and growth processes.

Bierman took issue with the current concentration of child services on the neonate at the expense of the older infant and young child, since major health problems in developing areas—undernutrition, malnutrition, and intestinal infections—begin during weaning and continue through the second and third years of life. She pointed out that some countries report about as many early childhood deaths as infant deaths.

During 1947-56, Bierman said, 601 WHO fellowships enabled maternal and child health workers to pursue training abroad, and through UNICEF-WHO assistance, governments set up, extended, or improved their personnel training facilities. She reported good progress in general in training personnel and in the extension of minimal services.

Manpower . . .

Health Manpower Challenge Tackled on Broad Front

Manpower for health work hinges most of all on how realistically the health profession meets the challenge of competition for labor in the face of a limited supply of skilled young workers, said Dr. Leonard A. Scheele, former Surgeon General of the Public Health Service, speaking as chairman of the Commission on Health Careers, National Health Council.

The commission was organized recently as an outgrowth of the Health Careers Project of the council, launched to support career development and recruitment for the profession.

Reviewing some of the accomplishments of the Health Careers Project, Scheele mentioned that it has highlighted the gaps in information on health manpower needs and in the health profession's plans to meet competition for labor. The project has also shown that such competition means more than recruitment, that

facilities, teachers, and earning opportunities may affect the interest of youth in health careers, and that such questions need study. Scheele also gave the project credit for opening the door to new and effective allies and, above all, for demonstrating that effective action must come from nongovernmental sources.

Scheele described the commission's five-pronged range of interest:

- The current and expected supply and shortages of health personnel; as well as the possibility of tapping other manpower sources.
- Utilization of personnel, including assessment of the health field's competitive position in recruitment.
- Job satisfaction, which includes earnings, fringe benefits, and opportunities for advancement, emphasizing solid facts rather than assumptions.
- Education and training for occupations in health, considering the impact of the school shortage on professional education; as well as new types of training for supporting occupations.
- Recruiting, with emphasis on evaluation of new methods and materials in communication techniques.

Scheele said that the most urgent questions which are open to prompt but lasting solution will be identified chiefly through factfinding and research, drawing on all accessible sources of information. In turn, the facts will be made available to all professional and voluntary associations, operating agencies, and educational institutions, to bolster their efforts in staffing health services.

He underscored the fact that the commission will take direct action, through the mediums of public information and education, to underpin efforts in training the Nation's youth in health fields.

Trained Records Personnel Major Necessity

Qualified workers are a first requirement of health department

record systems today, and only specialized training will provide such personnel, declared Alpha K. Kenny, formerly consultant in records training, Communicable Disease Center, Public Health Service, Atlanta, Ga.

Records, the mirrors of services, should reflect today's ideas, methods, and devices, Kenny stated. To accomplish this, trained supervisors are needed to manage records departments and to train staffs, she said.

The Public Health Conference on Records and Statistics, sponsored by the Public Health Service and the Association of State and Territorial Health Officers, has focused attention on the need for improvement in public health records and their management, Kenny stated. In addition, the nursing section of the Southern Branch, American Public Health Association, has promoted interest in records among nursing schools and field teaching agencies in the southern States, and the National Health Council, through its Health Careers Guidebook, has stimulated the interest of college students in public health records.

Training Opportunities

In 1953 the department of field training, University of North Carolina School of Public Health, the W. K. Kellogg Foundation, and the Public Health Service sponsored a working conference on the training of public health records personnel. In April 1957 the University of North Carolina School of Public Health and the Training Branch of the Communicable Disease Center, Public Health Service, offered a 2-week course on management of public health records. Twenty-six record analysts from 13 States and 6 Public Health Service units attended this course at Chapel Hill, N. C., Kenny reported.

A number of States offer opportunities for training to local public health records workers, and other States are planning similar courses, Kenny stated. The departments of health administration in two schools

of public health have held seminars on records management, and forms design has been included in their courses in public health statistics, she said.

Future Training Needs

Employers and merit systems have a joint responsibility for encouraging and helping employees to qualify for the more advanced positions in records management, Kenny asserted. She recommended that merit system authorities set up positions that will attract and hold competent people and that employees in the lower classifications be given inservice training that will qualify them for more advanced positions.

More than inservice training, short courses, institutes, and workshops is needed, however, to prepare personnel for advanced positions in public health records management, Kenny said. She suggested that undergraduate work in public health administration include courses in records management, and that graduate work be provided for students who can qualify for such programs.

Field demonstrations of public health records systems would be a helpful supplement to formal academic courses, Kenny concluded. Held in strategic locations, they would give students an opportunity to see records systems in actual use, she said.

Increased Financial Support Urged for Health Training

A plea for increased financial assistance for training in environmental health was voiced by Frank A. Butrico, chief of the Engineering Resources Program, Public Health Service.

Reviewing current grant and traineeship offerings, both inside and outside the Federal Government, he observed two major deficiencies: there is virtually no undergraduate assistance specifically for persons interested in a public health career; assistance for graduate students

planning to practice their profession, rather than go into research or teaching, is limited.

The Public Health Service, which among the Federal agencies has the major concern for sanitary engineering and related professional personnel, offers the following educational support in this field:

1. Research fellowships authorized by title III of the Public Health Service Act of 1944 were extended to sanitary engineering in 1957. They are aimed at increasing the number of engineers and scientists qualified to conduct independent research in problems of environmental sanitation.

2. Traineeships awarded under title I of the Health Amendments Act of 1956 are available to sanitary engineers, sanitarians, sanitary chemists, and allied personnel. These are intended primarily to bring new people into public health and thus give preference to persons who are under 35 years of age and who have had no more than 2 years' experience in public health and less than 1 year of graduate or specialized public health training.

3. Training grants-in-aid for study in air pollution control originate under the Air Pollution Research and Technical Assistance Act of 1955. Recipients are of three types: individuals, State and local government agencies, and educational and training institutions.

Recommendations of the Conference on the Education, Training, and Utilization of Sanitary Engineers held in the spring of 1957 indicate recognition of the need for increased financial aid, according to Butrico. This conference, he reported, recommended (a) that graduate fellowships and traineeships be expanded and that they carry no restrictions on the duration of training award to any qualified individual including the doctoral candidate and (b) that financial assistance be extended to undergraduate education of engineers and that a monthly stipend of not less than \$100 plus allowance for tuition and books be provided.

Butrico gave the following reasons for his contention that "much more assistance" for graduate students interested in environmental health is necessary: increasingly complex public health problems; general up-grading of health activities; the expectation that broad education will precede specialization; the need for increased competence in all sanitation personnel, including the sanitarian; the need for an "impressive battery of specialists trained in disciplines not necessarily a part of engineering," such as biologists, physicists, chemists, bacteriologists, and meteorologists; and the low starting and maximum salaries for an engineer in public service in comparison with those in industry.

Considering the question of financial assistance for higher education in general, Butrico observed that only 556 of the 58,000 students applying to the National Merit Scholarship Corporation in the first year of its operation (1955-56) received scholarships.

He also pointed out that a study by C. C. Cole, Jr., sponsored by the National Science Foundation, reported that insufficient financial resources appear to be the sole or primary reason why 60,000 to 100,000 persons of superior ability fail to enroll in colleges each year. The Educational Testing Service, he added, has estimated that some 150,000 high-ability students would have gone to college had adequate financial support been offered them.

Measures Nursing Needs Outside Hospitals

A new method of estimating the number of nurses needed by a community was described by Janice E. Mickey, associate professor of public health practice (nursing), Graduate School of Public Health, University of Pittsburgh. A study is being made of the basic nursing needs of the general population of Butler County, Pa., in order to determine how many public health nurses,

school nurses, and occupational health nurses are needed in the county.

The Study Sample

Families selected at random are interviewed by a nurse, who decides whether the family has health problems that might be helped by the services of a public health nurse, Mickey stated. The sample studied is large enough for generalizations to be made from the data and for an estimate of the extrahospital nursing needs of the population of the county.

To check the reliability of the estimate and to determine whether the single interview misses important problems that can be discovered only with intensive home care, county health department nurses give nursing care to all families considered by the interviewer to need such care, and certain families who were judged by the interviewer not to need nursing care are referred to the health department, Mickey said.

It is thought that referrals to the health department are influenced by the nurse's background and her concept of public health nursing. However, a check of estimates of need for nursing care by two nurses visiting the same 20 families showed a gratifying consistency in results of interviews, Mickey reported. Estimates of the need for care were more consistent than measurement of the family's ability to cope with a situation, she said.

The sampling process is complex and it is often difficult to locate and reach the households, Mickey stated. Interviews vary in length from 35 minutes to 2 hours, averaging an hour and 10 minutes. Nurses average a little over 1½ completed schedules per day in the early part of the study.

To see how effective the nursing service has been, a subsample of families is interviewed a second time. Families referred to the health department are reinterviewed after the public health nurse has closed the case; families receiving nursing care are reinterviewed at the end of 3 months.

The Interview Schedule

The interview schedule includes questions designed to obtain data on needs for bedside nursing care and treatment for acute and long-term illness, prehospital and post-hospital care, rehabilitation, and diagnostic services, as well as data on practice, skills, knowledge, and attitudes in relation to home care of the sick and ability to recognize illness, family health practices, and family health protection, including periodic health appraisal and immunizations.

The schedule was tested on a group of families with various health prob-

lems, and after analysis of the findings and some revision of the schedule, it was set up for coding. Although a small part must be completed by a coder, the schedule is for the most part self-coding.

The cooperation of the families interviewed has been excellent, and the entire community has supported the study, Mickey reported. The health department assisted with the basic plans; the board of health made it possible to obtain the approval of the medical society; and newspapers and radio stations paved the way for the interviewers who went into the homes.

The annual report of his department was first presented over station WHO-TV, Tuesday, February 1, 1955, from 1:30 to 2:00 p. m. In telling the group how to do it, he said, "First consider what you wish to accomplish."

Each section of the department submits monthly records from which annual reports are compiled.

To communicate the health department story, the program utilized role playing, problem-solving situations, conferences, cartoons, photographs, demonstrations, and charts. Christensen rewrote the material and fitted it to the allotted 30 minutes. Each section rehearsed its portion of the script separately. The entire department cast (15 members) rehearsed twice prior to the dry run at the TV station.

The telecast, besides department personnel, consisted of the chairman of the board of health, the city manager, the executive secretary of the Council of Social Agencies, and 14 others, including a mother and baby. In answer to the request for permission to televise the next year's report, the station manager asserted, "On one condition: It must be at least half as good as last year's report."

Education . . .

Communication's "Why?" Is All Important

Each health organization must improve its internal communications before it can expect to communicate successfully with its clients in the community, stated Chester S. Bowers, director of the bureau of public health education, Connecticut State Department of Health.

Bowers defined internal communication as "meaning and including all workers within an organization," and not exclusively professional and quasi-professional personnel. Communication even within a single organization, he said, is not substantially unlike problems, and ways to their solution, met in health education of the public.

Communication's "Why?" is more important than its "How?" Bowers said. He put the chief emphasis on persons concerned rather than on the medium or the material. The expert should be on tap and not on top, he told his listeners. No one, not even an expert, can give appropriate answers until given the questions. A symbol for effective communication may be thought of as a roundtable at which people are relating themselves to each other, he said. In

a network of mutuality, the lines of communication are down less frequently, and the messages are less likely to be misheard or misread.

He said, "The administrator or the officer and field practitioner within an organization today who looks upon communication simply as a matter of issuing a directive or statement of information is open to disappointment in the response elicited. Quite frequently these are the same individuals who fail to achieve the results they expect from health education programs they administer or at which they practice. Conversely, the administrator and practitioner with habitual willingness to permit careful and considered observation of each situation . . . is the more likely to gain the response and objective anticipated."

Annual Reports Recipe: Televising Them

The values of presenting a health department report through television were extolled by Sophus R. Christensen, director of public health education, Des Moines-Polk County Department of Public Health.

Golden Age Clubs Educate For Healthful Living

Some older people of their own accord obtain information and engage in activities which help them maintain health. For such people, Dr. Bernard Kutner, of the Albert Einstein College of Medicine, thinks special education programs are largely unnecessary. For others, they are highly necessary.

Although many physicians do not regard geriatric problems as a "specialty," they recognize the need to give specialized attention to the health problems of the aged.

An increasingly large number of people are enrolling in programs of adult education, recreation, leisure-time classes, and in clubs referred to

HOMEBOUND PATIENTS

as "Golden Age" or "Senior Citizens" clubs, Kutner said. It is in such clubs as these that they may learn about their specialized needs and how to meet them.

Kutner warned against mere exhortation as inducement to people to take action and said that, if exhortation is to succeed, the situation must be made meaningful to the individual, centering specifically on his personal situation.

Program Elements

As to the elements of a successful program for senior citizens, Kutner said:

1. Make the programs specific and thereby induce groups of older people to establish regular health habits. In groups, there is a tendency for each person to be influenced by the desires and wishes of the others.

2. Bring groups of older persons to various centers to see for themselves.

3. Keep the older person apprised of health education activities (radio and television programs, books, pamphlets, speakers).

4. Establish an up-to-date directory of health services available to older persons and provide at least one responsible individual who can make appropriate referrals to a health agency.

5. Make mental health an integral part of the program. The very programs the center creates are themselves aspects of the mental health education program.

Current Techniques

Kutner gave examples of programs throughout the country in illustration of techniques currently in practice.

The Marin County (Calif.) Senior Association purchases and prepares gifts to be distributed at hospitals by Red Cross Gray Ladies.

The New Hampshire Golden Agers assist the mental hygiene and child guidance clinic by sending birthday cards and letters to children under the care of the clinic.

The Amalgamated Clothing Workers of America, with one center in Philadelphia and one in New York, stresses the relationship between leisure-time activities, social adjustment, and the maintenance of health.

The Akron (Ohio) Golden Age Club prepares, for the General Hospital, medical records for microfilming or for mailing.

Senior Achievement Incorporated (Chicago) employs about 25 workers in the production of such items as wooden footstools, cradles, and sandals as well as in clerical and drafting jobs.

Meaningful Activities

Government and voluntary agencies have programs based upon the concept that physical well-being and sound mental health are enhanced by activities which offer an oppor-

tunity to the individual to contribute in some meaningful way to the community at large or which provides sources of additional income. He mentioned the Minnesota Department of Health, the Sirovich Center (New York City), the Ithaca (N. Y.) Senior Citizens' Center, the Women's Education and Industrial Union (Boston), and the Sunset Industries (Bangor, Maine), as outstanding examples.

In conclusion, Kutner pointed to the Pasadena-Altadena Committee on Aging, the Greater Muskegon Geriatric Council, and other agencies both public and private. These centers are training leaders for dealing with the aged. Such programs of leadership training and activities for the aged, and the wealth of health education materials indicate the scale on which the efforts for the aging are progressing.

Medical Care . . .

Home Care Programs Extend Hospital Care

The establishment of home care programs by general hospitals and use of the facilities of these programs by physicians for their private patients is proving to be a major and highly desirable development in medical practice.

This belief was expressed by Dr. Peter Rogatz, associate director, division of professional services, Health Insurance Plan of Greater New York, and Guido M. Crocetti, acting director of research and planning, New York City Community Mental Health Board, in their discussion of the impact of home care programs on the place of the hospital in medical care.

Service to the Community

New concepts of medical services to be provided by hospitals include home care programs which use teams of physicians and other professional

personnel to care for homebound patients who do not require hospitalization but who cannot be cared for in outpatient clinics. The growth of these programs is an indication of the hospital's development as the center of community health and medical services.

Most home care programs provide medical care to medically indigent or indigent patients by hospital residents, other salaried physicians, or practitioners in the community who devote only part of their time to the home care program. However, home care can be extended to self-supporting patients of private physicians without interfering with their professional and financial relationships, and provision of services to these patients will reduce the need for subsidizing home care programs.

Home care is a qualitative addition to community health services rather than a means of saving money or hospital beds. Caring for patients at home does not release an equivalent

number of hospital beds but it does take care of long-term patients who could not be given hospital care for extended periods.

Personnel

Experience in the home care of patients should be part of the training of medical, nursing, and social work students. Such experience should prepare them to understand and cope with the social and economic aspects of illness and should increase their appreciation of the hospital as a community agency. This understanding and appreciation will be reflected in their future attitude as practicing physicians, nurses, or social workers.

Employment of full-time physicians in home care programs has not proved satisfactory since most programs cannot offer salaries that will attract competent physicians. Employment of practicing physicians part time, either on a salary or fee-for-service basis, is more apt to attract well-trained practitioners.

Physicians who have served in the program will be influenced in their future interests and skills, and representatives serving on the board of directors of voluntary nursing agencies will be enabled to use the agency's home care experience in policy making.

Because of the widespread shortage of nurses and the experience of nursing agencies in providing home nursing service, home care programs usually use the services of existing nursing agencies. However, the quality of nursing care received by the patients will be directly affected by the skills of the physicians and the policies and procedures of the home care program.

Physicians' Private Offices In Hospitals Increasing

Medical staffs and hospitals are being brought into closer relationship through the establishment of private offices in hospitals or in connecting buildings, reported Dr. C.

Rufus Rorem, executive director of the Hospital Council of Philadelphia. The council, through a grant from the Public Health Service, is making a study of private office practice at institutions where physicians are carrying on individual practices, Rorem said.

Most of these facilities for physicians' private offices are owned by the hospitals, Rorem stated. Rents are comparable to those in other office buildings in the community. Occupancy is usually limited to active members of the hospital staff, with priority based on rank or length of service. Physicians occupy contiguous offices, share certain overhead expenses, and are available to each other for consultation and for referring of private patients.

Some income-sharing groups of physicians have rented space in hospital office facilities, Rorem said, but the development of such facilities apparently has not of itself inspired the formation of groups for private medical practice. However, it has acquainted many physicians with the advantages of practicing close to other physicians and of the accessibility of the equipment of a modern hospital.

The principal reasons for establishing physicians' offices at hospitals have been convenience, saving of time, and increased use of hospitals, Rorem said. Other reasons have been change of hospital location and changes in zoning laws.

Legal Considerations

Physicians' private offices are considered to be private business activities of the hospital and the capital investment has been subjected to real estate taxes in some jurisdictions, but the income received from them has not been subject to Federal income tax, Rorem stated. Use of endowment funds for the construction of office facilities at hospitals is legal, provided that the income is comparable to the income that could be expected from other investments, he said.

Government tax funds have not

been used directly for the construction of office facilities at hospitals, although some "Hill-Burton" hospitals have included such offices. Local banks have loaned funds for this purpose, according to Rorem. No public campaigns for funds for office facilities have been held as far as he knows.

Advantages

Physicians who maintain offices at hospitals agree that this arrangement enables them to practice better medicine with less expenditure of time and energy, to have more personal contact with inpatients, and to make hospital rounds more often, Rorem said. Other advantages are the saving of transportation time between office and hospital, the ease of referring patients to fellow staff members, and the fact that in an emergency hospital patients can be seen without major interference with office appointments. One physician reported that he orders private-duty nurses less frequently since he is easily accessible in an emergency, Rorem reported. Hospital diagnostic facilities are easily available, and patients who become used to visiting the hospital for office calls are less resistant to hospitalization, physicians find.

Patients find that the physician who maintains his office at the hospital is usually in or easily available, and office appointments are not canceled because of hospital emergencies, Rorem stated. They also find it convenient to consult other hospital staff members to whom they are referred and to visit hospital departments for diagnostic and treatment services.

In the opinion of hospital trustees and administrators, location of physicians' offices at hospitals has resulted in a feeling of unity between the institution and the medical staff, Rorem reported. Physicians learn about hospital costs, can observe the critical phases of recovery of their patients, and become familiar with the duties performed by other members of the hospital staff.

Disadvantages

With their offices at the hospital, physicians lose some fees because they no longer perform minor laboratory tests in the office, Rorem stated. Some hospital staff members who do not have offices at the hospital feel that the physicians who do have offices there are more likely to be called to treat staff service cases in an emergency. And relatives of hospital patients sometimes pay time-consuming visits to their physician to discuss members of their families.

Rorem pointed out that patients will go any distance for inpatient hospital service but they feel that their physician's office should be conveniently located, and if it is not they may not make office visits regularly.

Costs of renovation or construction and difficulties in assigning space when there are more staff members than offices have sometimes deterred hospitals from establishing private office facilities, Rorem stated.

In conclusion, Rorem said that locating physicians' offices in or adjacent to hospitals is an effective use of capital and coordinates professional services. The potential public health value of such an arrangement is great, and it will probably be more fully realized in the future.

Government Must Study Medical Care Needs

The chief need of health agencies is to learn more about the quality and comprehensiveness of medical care, including how patients seek care, reasons for discontinuation and overlapping of services, what services people want, and the reaction of patients to the care they receive, in the judgment of Dr. Leona Baumgartner, commissioner of health, New York City, and Margaret Klem, medical economist, Public Health Service.

With the rapid growth of voluntary health insurance, the development of inplant health units or union health centers in industrial areas,

the increase in services offered by medical societies, fraternal organizations, and some religious groups, and the expansion of agencies dealing with specific diseases, the public is becoming increasingly interested in both preventive and curative health services and is demanding more and better medical care, they said.

Although cost is a factor in a patient's decision to seek medical care, his cultural background, his education, and his own or his neighbor's experience may be as important influences on his knowledge and attitudes toward medical care as is his economic status, they believe.

However, regardless of how the cost is met, no comprehensive picture of the use of health and medical care services is possible without knowledge of the kinds and sources of professional care received, they assert. It is equally important, they add, to know, for example, the relationships among agencies, between agencies and physicians, and between the patient and each person or agency who provides medical care, in order to determine what relationships are desirable and what should and can be done to improve existing relationships.

A study of health and medical care services by the New York City Health Department seeks to discover the kinds of medical services families receive from voluntary health insurance agencies, to find out why patients go from one source of medical care to another and what pattern of change they follow, and to ascertain their reactions to the care received. These data may also reveal gaps or duplications in services provided by various agencies.

It is hoped by Baumgartner and Klem that this study will reveal factors that either impede or promote effective use of health services and ways in which the administration of medical care services can be geared to community needs and demands. The results may indicate the need for a continuing program that will keep practicing physicians informed of both existing and new

activities and of the extent to which various health agencies serve as case-finding agencies as well as coordinators of medical services.

The study, they feel, is sure to point out certain ways of improving specific local health services. It is an example of one of many kinds of studies they believe are fundamental to a better understanding of problems of providing medical care in this country.

Joint studies by health personnel and social scientists and the efforts of public health departments, medical groups, and universities are needed, they say, if health and medical care services are to be the best that medicine can offer.

Windsor's Medical Plan Termed a Success

About 85 percent of the residents of Windsor, Canada, participate in Windsor Medical Service, a voluntary, comprehensive prepayment plan which provides medical services at home or in the physician's office, and surgical, obstetrical, and special services, X-ray and laboratory services, and hospital care to its subscribers on a fee-for-service basis.

The results of a 3-year study of the Windsor Medical Service plan were reported by Benjamin J. Darsky, Dr. Nathan Sinai, and Dr. Solomon Axelrod, of the bureau of public health economics, School of Public Health, University of Michigan, Ann Arbor. Their investigation of Windsor's 20-year experience with the plan indicated that comprehensive physician's care insurance is needed, is not used unreasonably, and is paid for willingly in that city. Results of the study also suggested that the reasons usually given for limiting physicians' services in prepayment plans are not valid.

Principal Issues

Because the cost of individual home or office visits is usually modest, it has been said that insurance should cover only surgery or hospitalized illness. Although most in-

dividuals and families did not receive many home visits or make many office visits in a given year, the cost to those who did require many services was high; 1 family required the equivalent of \$1,270 worth of such medical care in 1 year. The need for comprehensive medical insurance is further indicated by the fact that WMS subscribers seek medical care more often and, once care is sought, receive a greater number of services than do nonsubscribers to the plan.

The study, however, found no indication that WMS subscribers used an unreasonable amount of service. It has sometimes been assumed that subscribers to comprehensive medical care plans will seek the services of a physician for trivial reasons more often than will those with limited or no insurance. In Windsor, 33 percent of the subscribers to WMS requested no care at all during the year; 26 percent used the services of a physician only once, compared with 33 and 36 percent, respectively, of those in the limited and no-insurance categories. For all, with comprehensive, limited, or no insurance, the percentages using the service of a physician 2 or 3 times were about the same.

The additional cost of insurance providing comprehensive medical care has been willingly accepted by the population of Windsor. In fact, to retain their present benefits, 80 percent of WMS subscribers would pay increased premiums. Subscribers to limited benefit plans are willing to pay larger premiums for the WMS type of protection and, given the opportunity to enroll in an insurance plan, about two-thirds of the group who have no medical care insurance would be willing to pay the WMS premium.

Physician-Patient Relation

The fear that, with no direct payment required, patients will "shop around" for medical care has proved to be unfounded. About 92 percent of WMS subscribers have one physician to whom they go when they need medical care. Approxi-

mately the same proportion, about 70 percent, of WMS subscribers and nonsubscribers, received all of their home and office care from their regular physician, about 20 percent saw 2 different physicians, and very few in either group saw 3 or more practitioners.

Physician's Income

The effect of a fixed schedule of fees on the physician's income is a major issue in medical care insurance plans. Under WMS, Windsor physicians consider that their incomes equal or exceed the income they expected to be receiving at the current point in their careers. Fee schedules for WMS and private charges were quite similar. WMS subscribers provide 68 percent of the patient load of Windsor physicians and 60 percent of their total income. The majority of physicians considered the WMS fee schedule reasonable. About 70 percent of physicians reported that the plan had helped them gain a steady, assured income, and more than half said that the plan had helped them to build up their practices.

Administration and Costs

Apparently there is little friction or antagonism between WMS physicians and administrators of the plan. Administrative routines were generally satisfactory, and 96 percent of the physicians wanted no changes made in reporting methods.

Cost accounting has disproved the assumption that processing of small claims incurred under prepayment plans such as WMS approaches the cost of the claim itself. The average processing cost per claim was 14 cents, or 2.3 percent of the claim. The per service cost was 9 cents.

Latin-American Countries Extend Health Services

Economic, social, and educational factors have governed the organization of medical care in Latin America, stated Dr. Alfredo Leonardo Bravo, chief, social and occupational health section, World Health Or-

ganization, Geneva, Switzerland. No generalization should be made, he said, since local conditions in other countries may lead to an entirely different approach.

Relatively high salaries are found only in large cities, where industry is concentrated, Bravo said. A large proportion of the population lives in agricultural areas, where salaries are one-third to one-fourth of those in industrial areas. In 50 percent of the countries the average per capita income is only \$150 a year.

In the cities, a large proportion of industrial workers live in slums, Bravo said. Transportation and communications are poor and illiteracy is common. In 9 out of 20 Latin-American countries, 50 percent of the population is illiterate, and in one country the percentage is 89.5. Because of this pattern of poverty and ignorance, only a small minority are able to make any provision for medical emergencies. The large majority cannot, or are reluctant to, join a prepayment plan or even to pay for medical services.

Health Services

According to Bravo, the first health services in Latin America were provided through the *beneficencia* public hospitals, which were established in the 16th century. Hospitals still preserve the character of these early institutions in the provision of free care to the indigent by part-time physicians who receive only a token salary, he said.

In Latin America today, a basic need in any public health program is the medical treatment of patients, Bravo stated. However, during the treatment period, when the patient and his family are concerned with health questions, the physician has an opportunity to interest them in public health matters such as nutrition and sanitation.

The shortage and uneven distribution of health personnel have limited medical services in Latin America, prevented the development of a good system of death certification, and hampered the development of health statistics, Bravo declared.

Efforts have been made to attract physicians to rural areas, but none have been really successful, he said.

In Latin-American countries, state-financed public health services are responsible for health services to the entire population, Bravo stated. Local health units give preventive services to individuals, but the need for curative treatment is so pressing that these local units are devoting more and more time to this service, he said. Maternal, child, and school health services are part of the local health activities. Government-sponsored hospitals and clinics give free care to the medically indigent as well as to paying patients.

All Latin-American countries provide sickness insurance which gives varying amounts of care to ambulatory patients, Bravo reported. This insurance is usually compulsory for industrial workers and, in some countries, for all workers and employees. Coverage is now being offered to new groups of workers and to families.

Chile's National Health Service

In Chile, the National Health Service administers the majority of health agencies. This service is responsible for public health and medical care activities for 70 to 75 percent of the population, Bravo stated. Other organizations provide medical care to civil servants and white-collar employees, the military forces, the police force, prisoners, and railway employees, and an Accident Insurance Fund has its own medical services. Together, these organizations provide medical care to about 90 percent of the population of Chile, Bravo said, leaving only a very small group which finances its own medical care.

The three organizational principles of Chile's National Health Service have been centralization of directives and technical standards and decentralization of the operation of programs, integration of public health and medical care services, and participation of local communities in the planning and execution of

health programs, Bravo stated. This service is responsible for the provision of public health services to the whole population and provides medical care services for about 70 to 75 percent of the people. The National Health Service has established two priorities, he said. The first priority had been assigned to comprehensive medical care and protection of the health of mothers and children, the second to nutrition and food.

Although many people feel that the system could be improved, Bravo concluded, all agree that central administration of health services is worth while.

Unified Health Services In Malaya and Singapore

In underdeveloped countries with limited resources, better health can be achieved only by giving priority to the preventive services which are an investment for the future and using any remaining resources for providing curative services, stated Dr. I. S. Falk, of Stonington, Conn. Such a policy can only be carried out through a system of unified health services with salaried staff and regional services, he declared.

In Malaya and Singapore, competent administration of a unified health program has accomplished more with limited resources than would have been possible with separate preventive and curative programs, Falk said. In these countries, only nominal charges are made for personal services. Government health programs are supplemented by the services of private physicians for those who can afford them.

Health Services

The national health program in Malaya is the responsibility of the director of medical service, who works under the Minister of Health and Social Welfare, Falk stated. Local health functions are under the jurisdiction of the state or settlement health departments and local health departments, with partial

Federal control of funds and staffing. Health services provided by the government are supplemented on agricultural estates and mines by hospitals and clinics provided by employers; by voluntary health agencies; and, in urban areas, by private practitioners and hospitals, he said. Mobile health units operate on fixed schedules on the main roads and, in five states, on the rivers.

In Singapore, the responsibility for health services is divided, but coordinated, between the Ministry of Health of the colony and the health department of the city council. Water and sanitation are under the public works department. The official health agencies operate hospitals, clinics, dispensaries, and health centers.

Personnel and Funds

In Malaya, nearly all government health services have full-time staffs, although some part-time personnel are employed now when foreign recruitment is at a standstill. Falk said that in Singapore, with the increasing numbers of graduates from the university's medical school and the government's training school for nurses, there is no acute shortage of personnel.

Public funds finance both community and personal health services in Malaya, although fractional charges cover about 10 percent of the costs of personal services, Falk stated. The government devotes about 10 percent of its budget to health services, and about one-third of this amount is spent for preventive services, he said. With approximately an equal amount spent privately, aggregate expenditures for health are about 3 percent of the national income. In Singapore, aggregate public and private expenditures are about 4 percent of national income, government expenditures accounting for about one-half.

Vital Statistics

Birth rates are stable at 45 births per 1,000 in Malaya and 50 per 1,000 in Singapore, Falk reported. Death

rates have fallen to about 12 per 1,000 in Malaya, less than 9 per 1,000 in Singapore. In Malaya, infant mortality, formerly 100 to 200 per 1,000 births, is down to about 75. Maternal mortality in Singapore has dropped from 3 to fewer than 1 per 1,000 live births.

There are still many health needs in both countries, Falk stated. In

Malaya, tuberculosis is highly prevalent and as yet is not effectively controlled. Venereal disease is widespread, but the number of known cases is declining steadily. Rural health services are still in the developmental stage. Mental disease services are acutely inadequate. Health education still has difficult problems. In Singapore, the most

serious disease is tuberculosis, he said, although much has been done to combat it through direct attacks and health education.

The success of unified health services in Malaya and Singapore invites study of this pattern of services by health authorities for application to other underdeveloped countries, Falk concluded.

Universities Expand Curriculums

University of California. Three new courses in air pollution research and control enable graduate students to obtain advanced degrees with emphasis in that field in the School of Public Health or in the College of Engineering at the University of California, Berkeley.

These courses are urban meteorology; a lecture and seminar course in atmospheric pollution control; and a laboratory and lecture course in atmospheric pollution, including areawide monitoring. At least two of the subjects will be offered in a 6-week summer session in 1958.

A range of courses in allied fields may be used to complete requirements for an advanced degree. Further information may be obtained from Dean C. E. Smith, Public Health, Dean M. P. O'Brien, Engineering, or Professor B. D. Tebbens, University of California, Berkeley 4, Calif.

University of Michigan. During March 19-21, 1958, the University of Michigan School of Public Health, in collaboration with the Illuminating Engineering Society, will present a course on light and vision. The course is designed to identify and illustrate principles that underlie seeing in various lighting environments, and to outline measures by which these principles may be employed to obtain optimum conditions for seeing, particularly in schools and offices.

Further information may be obtained from H. E. Miller, Director, Continued Education Service, School of Public Health, University of Michigan, Ann Arbor.

From June 19 through August 1, 1958, the university will offer courses in public health statistics. These summer courses, elementary, intermediate, and advanced, are part of a cooperative program carried out by accredited schools of public health and supported by a research training grant from the National Institutes of Health, Public Health Service.

The summer program is designed for statisticians and epidemiologists with health agencies, health workers in voluntary agencies and pharmaceutical companies, and graduate students, research workers, and teachers in statistics and the health sciences.

For graduate students, these are credit courses. Deadlines for applications and transcripts are May 1 for nonresidents of Michigan and June 1 for residents. Application forms and further information can be obtained from the Director of the Summer Program in Public Health Statistics, School of Public Health, University of Michigan.

University of North Carolina. The department of sanitary engineering of the School of Public Health, University of North Carolina, now offers a graduate program leading to the degree of doctor of philosophy.

Candidates for the doctorate must have a master's degree in sanitary engineering, sanitary science, or sanitary chemistry and biology.

Fellowships and assistantships in research and teaching are available. Information may be obtained from the Department of Sanitary Engineering, P. O. Box 899, Chapel Hill, N. C.

"The specialist in communications, oral, written, and visual, is an important member of the modern health team. This fact is evident in the growing number of these personnel who are taking their places on the staffs of voluntary and professional health organizations and of official agencies at all levels of government."



The Health Message

JOHN D. PORTERFIELD, M.D.

A HALL OF HEALTH offers an excellent device for imparting knowledge about health and disease. We in the Public Health Service are proud to have had a part in the rebirth of a Hall of Health in the great Smithsonian Institution. The information on human anatomy and physiology which it presents should have a substantial impact on the knowl-

Dr. Porterfield is Deputy Surgeon General of the Public Health Service. The address was delivered at the ceremony opening the Hall of Health, Smithsonian Institution, Washington, D. C., November 2, 1957.

edge and behavior of the many thousands of visitors to the Institution each year.

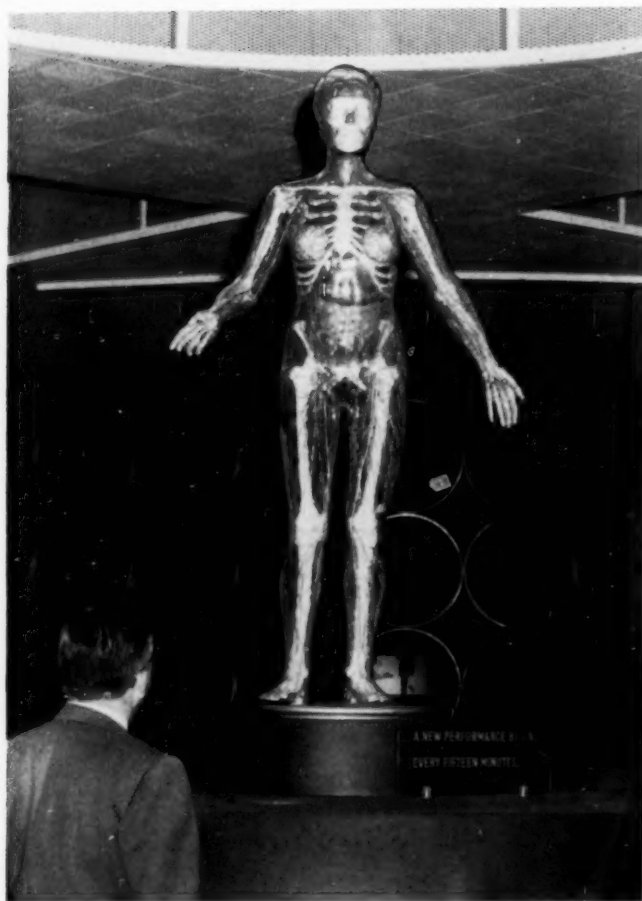
Within the limits of time and space, the exhibit is probably among the best devices man has invented to communicate facts and ideas about the physical world. At its best, it combines the advantages of language and visual presentation in a specific and coordinated message with a high teaching potential. From the scratched stone drawings of ancient times to the sophisticated three-dimensional clay models of today, exhibits have been used to teach and to stimulate interest.

Certainly, the exhibit has long been an im-

Hall of Health



Modern exhibit techniques in the Smithsonian Institution's new Hall of Health both educate and fascinate as they develop the theme: "Through the Ages, Man's Knowledge of His Body." Opened in November 1957 in the Arts and Industries Building, the hall stresses health rather than disease.



Exhibits illustrate effectively how the normal, healthy body is put together and how it works. Stages in embryo growth, birth and growth of a baby, bones and muscles, teeth, heart and circulation, digestion, respiration, endocrine glands, eye, ear, and nervous system are all represented.

Historical units display detailed reproductions of votive offerings, ancient manuscripts, and pages from the earliest printed books showing embryology, the skeleton, heart, brain, and digestive system as our ancestors knew them.

A center of attraction is the transparent figure of a woman (left) which, through electronics, light, and sound, shows the site and explains the function of major organs in the body. Other pushbutton exhibits reveal the inside of the human heart, anatomy of the tooth, site and action of endocrine glands, and brain function of a baseball player at bat.

The popular wall exhibit, "Growing, Growing, Grown," has a series of cutout forms of varying sizes (above) for determining typical heights of children at years 3, 6, 9, 12, and 15. Activities characterizing each age are illustrated in photographs mounted at appropriate intervals along the cutout series.

portant means of communication in the fields of science and medicine.

The first American scientific exhibit as it is known today was displayed at the annual meeting of the Indiana State Medical Association in 1899. It consisted of a large collection of pathological specimens prepared by two Indianapolis physicians. It was such a great success that the two physicians displayed it the same year at the meeting of the American Medical Association held in Columbus, Ohio. Since 1900, the scientific exhibit has been an official part of the annual meeting of that association.

Today every sizable group in the health field gives the exhibit equal status with scientific papers and other original presentations.

But exhibits also have broader and more general uses. With the complex growth of our society, it has become necessary to use the exhibit not only as a professional and scientific tool but also as a means of reaching the general public. In 1904 the first tuberculosis exhibit for the general public was developed in Baltimore. It attracted nationwide attention, and was soon followed by a similar display at the American Museum of Natural History in New York where it was seen by thousands of visitors. The following year, the exhibit toured the Eastern States, under the sponsorship of the newly organized tuberculosis association and the guidance of one of the early disciples of visual health presentation, Evart G. Routzahn.

Since that time, the health exhibit has become a staple of numerous meetings and shows, and particularly of State and county fairs in rural areas. The modern era, however, ushered in many new and wondrous communications media: films, filmstrips, radio, and television. In comparison with these devices, the exhibit was thought to be archaic as a health education technique. Enthusiasm for exhibits seemed to wane.

Yet in 1939-40 the special hall of "Medicine and Public Health" of the New York World's Fair drew an estimated audience of 7½ million people. A popular health fair organized in 1954 in Miami, Fla., by the American Medical Association, with exhibits of the major professional, voluntary, and governmental health agencies of this Nation, attracted about 50,000

visitors in 4 days. There were comparable crowds at subsequent health fairs in such cities as Los Angeles, Cincinnati, and Oklahoma City.

I believe this is indicative of a number of things, but primarily of the tremendous popular interest in health matters. A recent survey, for example, revealed that newspaper readers wanted to see more articles on health than on any other single subject. Most of the major mass circulation magazines have special science and health departments. Popular pamphlets on health and hygiene reach millions of readers each year.

This reservoir of interest and awareness represents a challenge to us in public health as it does to those in the broad field of education.

As specialization in medicine and science becomes narrower and deeper, as new knowledge emerges from laboratories and research institutions, and as modern life becomes increasingly complex, it is essential that we rely more and more on easily understood methods of communication.

Since World War II, the volume of medical research in this country has increased about fivefold. We are beginning to make inroads on the problems posed by chronic illness and an aging population. There are things that can be done to treat some forms of heart disease, tests of value in diagnosing some forms of cancer, and new techniques in the treatment of mental illness. Thus, the pool of information which demands interpretation and application continues to grow.

To us in public health, this means that the specialist in communications, oral, written, and visual, is an important member of the modern health team. This fact is evident in the growing number of these personnel who are taking their places on the staffs of voluntary and professional health organizations and of official agencies at all levels of government.

For many years, for example, the Federal Government has made use of exhibits to help convey useful information of all kinds, both to professional groups and to the general public. In the health field, the medical museum was started by the Army during the Civil War. For almost a century, this nearby neighbor of the Smithsonian has made significant contri-

butions to medical knowledge through its exhibits. The Public Health Service, too, has found this technique of communication invaluable, as have State and local health departments.

Today's challenge is no less great for such great institutions as the Smithsonian. The exhibit will always have a place in health education. As long as a youngster's curiosity is whetted by a visual presentation of the marvelous mechanism that is the human heart, then exhibits have no peer as a health teaching resource. As long as there is zest for knowledge, then there is a need for new and better and more vivid ways of bringing that knowledge to people.

Certainly we need to know more about how people learn through visual experience. We need to know how to improve the presentation of facts and information and arguments through visual means. We need to know how to take advantage of the "teachable moment" that a superior kind of exhibit can make possible.

Bruno Gebhard, director of the famous Cleveland Health Museum, has called a permanent health museum a "people's university," where visitors may see, study, and learn at their own pace and in their own way. In this new Hall of Health, the Smithsonian Institution has a "people's university" offering guidance to better health for more Americans.

Divorce and Annulment Data Collection Improved

An improved system of collecting statistics on divorce and annulment of marriage was adopted January 1, 1958, by the Public Health Service. A divorce and annulment registration area has been set up as a start toward obtaining figures on divorces and annulments as reliable and comprehensive as on births and deaths.

Since some States do not collect statewide figures on divorces and annulments, national statistics are based partly on estimates.

The new system not only provides a more accurate count, but also includes additional social and economic data on family breakdowns, information of value to courts, health and welfare agencies, and other groups dealing with dependency, juvenile delinquency, mental illness, and related problems.

The uniform data will be collected by the National Office of Vital Statistics, in cooperation with 14 States and 3 Territories: Alabama, Georgia, Idaho, Iowa, Montana, Nebraska, Oregon, Pennsylvania, South Dakota, Tennessee, Utah, Virginia, Wisconsin, Wyoming, Alaska, Hawaii, and the Virgin Islands.

Audiometric Testing of School Children

SAMUEL M. WISHIK, M.D., ELIZABETH R. KRAMM, M.A., M.P.H.,
and ELVIRA M. KOCH, R.N.

HEARING of school children in Reading, Pa., was tested biennially during the 8 school years 1946-47 through 1953-54 by the staff of the Reading School District. In 1952, results of these tests were used in a study of 1,726 children in the fifth and sixth grades conducted under the auspices of the School Health Committee of the Pennsylvania Public Health Association. These children were selected because they had been tested biennially for a 6-year period. The 6-year study included prognostic implications and the relationship of hearing to academic retardation. In a report of the 1952 findings, the effectiveness of a biennial audiometric testing routine was evaluated, procedures for sweep check and threshold audiometric tests were described, and some of the definitions used in the study were given (1).

The present report covers the 8-year period 1946-54. The study continues to explore the question of the optimum periodicity of routine audiometric testing, measures the apparent impact of hearing impairment on academic progress, identifies certain prognostic signs, makes observations on the audiometric patterns of children between 5 and 14 years of age. Audiograms have been analyzed and the data are presented according to the ear involved and the age of the children rather than their

grade level. Since reasonably complete information on medical findings and treatment was not available, this important aspect of the problem cannot be reported. Administrative recommendations and research suggestions are offered in the light of the findings.

During the period from 1952 to 1954, 1,592, or 92 percent, of the 1,726 children previously reported on (1) had at least one audiometric test. Other than those who transferred out of the Reading public schools, only 36 children from the original study group who were still attending school were not tested.

Method

Frequencies on the audiogram were divided into low, middle, and high ranges. Frequencies 128 and 256 were included in the low range; 512, 1,024, and 2,048 in the middle range; and 4,096 and 8,192 in the high range. Frequencies 2,896 and 5,792, not done routinely, were included in the high range. Frequency 11,584 was not used in this study although it was included in the test procedure. Overlapping of frequency ranges was avoided in order to facilitate the drawing of statistical conclusions. In the remainder of the paper, frequencies will be referred to in round numbers.

To pass the threshold test, a child was expected to hear frequencies 250-4,000 at 20 decibels, frequencies 125 at 25 decibels, and frequencies above 4,000 at an average of 30 decibels. He was considered to have failed the test if his hearing fell below the standard in two or more frequencies in either ear. The average of frequencies above 4,000 was counted as one frequency.

Dr. Wishik is professor of maternal and child health and Miss Kramm is research associate in maternal and child health, Graduate School of Public Health, University of Pittsburgh. Miss Koch is a school nurse with the Reading School District, Reading, Pa. This paper was presented in part at the annual meeting of the American Public Health Association in Atlantic City, N. J., November 14, 1956.

The scale of severity of hearing impairment was: average hearing at 20 decibels or less, normal; 21-30 decibels, slight hearing loss; 31-40 decibels, moderate loss, and over 40 decibels, severe loss. Despite differences in passing standards, the same scale was applied to all three frequency ranges, in order to give full consideration to the possible significance of the very low and the very high ranges.

Periodicity of Testing

A routine biennial testing program should reach 50 percent of the total school enrollment each year. This was accomplished by routinely testing all children in the first, third, and fifth grades. More than 50 percent of the children were tested each year except in 1946-47 and 1947-48, the first 2 years of the study, when 48.1 and 46.7 percent, respectively, were tested. In addition to the routine tests in the odd grades, children were tested whenever special indications existed. Therefore, more than 50 percent were usually tested in any year. The largest number tested in any one year during the study period was 69 percent.

A tally of the number of children given an audiometric test in a particular year does not give a complete picture of the extent to which a given child is tested during his school career.

When a testing routine is administratively organized by school grades, the goal of biennial testing of a given child can be disrupted by late admission to school, early dropout from school, or repetition of grades. The age groups studied were 5-7, 8-9, 10-11, 12-13, and 14 years and over (table 1). Sixty-nine percent of the children were tested over the desired span of four or more 2-year intervals. Among the 116 children who failed a test at any time during the study, 70, or 60 percent, had this span of test coverage, and all but 3 of the remaining children were carried through 3 age groups.

The span of coverage by age groups indicates the time from beginning to end of the testing of any given child but does not imply that there was continuity or completeness of testing within that period. Table 1 indicates the longitudinal extent of the study and demonstrates that, despite the greater administrative problem, any routine program of periodic audiometric testing should be scheduled for individual children by age group rather than by academic grade.

Effectiveness of Periodic Retesting

Of the 1,726 children in the study, 116, or 6.7 percent, failed an audiometric test one or more times. These children are designated as "ever

Table 1. Age span of audiometric test coverage of total study population and of children who ever failed a test

Age-group span	Number age groups spanned	Children					
		Number		Percent			
		Tested	Ever failed	Tested	Ever failed	Tested	Ever failed
Total.....		1,726	116	100.0	100.0	100.0	100.0
5-7 through 14 and over.....	5	29	8	1.7	6.9	1.7	6.9
5-7 through 12-13.....	4	1,075	50	62.3	43.1	67.7	53.4
8-9 through 14 and over.....		93	12	5.4	10.3		
5-7 through 10-11.....	3	221	17	12.8	14.6	27.7	37.0
8-9 through 12-13.....		206	17	11.9	14.6		
10-11 through 14 and over.....		51	9	3.0	7.8		
5-7 through 8-9.....	2	11		.6		3.0	2.6
8-9 through 10-11.....		22	1	1.3	.9		
10-11 through 12-13.....		15	2	.9	1.7		
12-13 through 14 and over.....		3		.2			

failed." The failures were fairly evenly distributed within each age group (table 2). The high percentage of failures among children 14 years old and older should be disregarded since these are an atypical group. Sixty-five, or 7.5 percent, of 869 boys failed an audiometric test at some time during the study compared with 51, or 6.0 percent, of 857 girls.

The age distribution shown in table 2 is of no help in assessing the case-finding effectiveness of the biennial test program in children of different ages since it does not indicate how many new cases of hearing impairment were discovered in each age group. Nor would data on age at first discovery of hearing impairment give information on the increment resulting from a biennial test program unless all new cases had been tested in the biennium immediately prior to their first failure and had passed that test. Only these children can correctly be defined as "candidates for first failure by biennial retest."

Table 2. Number children tested and number and percentage who failed a test, according to age group at time of test

Age group (years)	Number tested	Failed	
		Number	Percent
5-7-----	1,336	31	2.3
8-9-----	1,595	64	4.0
10-11-----	1,661	52	3.1
12-13-----	1,467	45	3.1
14 and over-----	176	18	10.2

The percentage of such candidates who failed the test drops progressively with age, from 2.3 percent in the age group 8-9 years to 1.0 percent in the group 10-11 years old, to 0.8 percent in the next higher age group (table 3). In other words, the returns from routine biennial retesting become progressively smaller as the test program continues through the age groups.

In sharp contrast, the percentage of children who failed the first audiometric test increased with age (table 4). Obviously, delayed first testing occurred in a selected group of children who had a high rate of failure in the audiometric test. This kind of experience has contributed to the impression that newly developed

Table 3. Number of candidates for first failure at biennial retest, according to age group, and number and percentage of new cases found

Age group (years)	Candidates for first failure, at biennial retest ¹	New cases	
		Number	Percent
8-9-----	1,243	28	2.3
10-11-----	1,449	14	1.0
12-13-----	1,329	10	.8

¹ "Candidates" are defined as children who had never previously failed an audiometric test and who had been tested in the immediately preceding age group.

hearing impairment occurs rather often among older children, whereas hearing loss probably existed for an unknown time prior to the time of the first audiometric test and prior to discovery of hearing impairment in many instances.

Data on longitudinal observations of the entire study group indicate that the results of the first tests given to a group of children make it possible to identify the majority of those who will fail an audiometric retest (table 5). Among the 1,305 children who passed the hearing test in the first age group, 43 (3.3 percent) failed a subsequent test, and only 12 (1.1 percent) of the 1,062 children tested in the group aged 12-13 years showed a failure at that time. On the other hand, among the 31 children in the first age group who failed the test, 15 (48.4 percent) failed again later, and 9 (29.0 percent) failed at 12-13 years of age.

Even though subsequent test histories of those passing and those failing the first audiometric test differ greatly, a subsequent failure

Table 4. Number of children taking audiometric test for first time and number and percentage of new cases discovered, according to age group

Age group (years)	Children taking test for first time	New cases	
		Number	Percent
5-7-----	1,336	31	2.3
8-9-----	321	23	7.2
10-11-----	66	6	9.1
12-13-----	3	-----	-----

Table 5. Sequence of results of audiometric retests, according to first test findings on 1,726 children, by age group

5-7 years	8-9 years	10-11 years	12-13 years		
			Pass	Fail	Not tested
Pass..... 1,305	Pass..... 1,215	Pass..... 1,167	965	4	198
		Fail..... 11	5	3	3
		Not tested..... 37	26		11
	Fail..... 28	Pass..... 18	17		1
		Fail..... 10	1	5	4
		Not tested.....			
Fail..... 31	Not tested..... 62	Pass..... 61	55		6
		Fail.....			
		Not tested..... 1	1		
	Pass..... 18	Pass..... 16	8		8
		Fail..... 1	1		
		Not tested..... 1		1	
	Fail..... 13	Pass..... 4	3		1
		Fail..... 9	1	8	
		Not tested.....			
	Pass..... 298	Pass..... 271	246	1	24
		Fail..... 4	2	2	
		Not tested..... 23	22	1	
Not tested..... 390	Fail..... 23	Pass..... 12	9	2	1
		Fail..... 11	2	9	
		Not tested.....			
	Not tested..... 69	Pass..... 60	53	5	2
		Fail..... 6	3	3	
		Not tested..... 3	3		

rate of 3.3 percent in the passing group is still too high to discontinue retesting. But the justification for discontinuing testing grows stronger with each retest. Children who have passed all tests while in the first two groups are unlikely ever to fail subsequently. Eleven of 1,215 children in this category failed the test at 10-11 years, a failure rate of 0.9 percent, and only 7 out of 1,003, or 0.7 percent, of those tested failed in the group aged 12-13 years. When children miss taking a test in 1 of the first 3 age groups but pass in the other 2 groups, a similarly favorable pattern is present; only 1 out of 327, or 0.3 percent, failed after passing both tests done in the first 3 groups.

If routine audiometric testing had been discontinued for children successively passing the audiometric test in two early age groups without a history of any test failures, only approximately half the routine tests reported would have been done. If such a restricted procedure had been followed and if reliance had rested entirely on the routine testing program, 16, or 13.7 percent, of the failing children would have been missed. The suggestion that the age span

of the routine part of the test program be restricted will be modified later in the light of other findings.

Chronicity of Hearing Loss

A more detailed analysis of the longitudinal pattern of test results among the 116 children who ever failed a hearing test gives additional clues to answer the question, What is the best timing and frequency of routine audiometric testing? Most of these children did not have continuous hearing loss. They failed the audiometric test 275 times, or 49.3 percent of the 558 tests they took. The extent of "chronicity" among them and in their 177 ears whose hearing was ever affected is shown in table 6. The distribution of chronicity of hearing loss among pupils and among ears was similar. About half the audiometric test failures, those in the "temporary short" and "indeterminate" groups, were not repeated. There were other nonpermanent types of hearing loss; only 29 percent of the failing pupils and 24 percent of the failing ears fell into the definition of "con-

tinuous hearing defect" after failure of an audiometric test had first occurred.

In view of the common occurrence of a short duration of hearing loss, is the biennial test interval too long? How many new cases would be discovered by an annual testing program? On 427 occasions, 302 children who had never failed a hearing test were retested 1 year after a previous test. In a sense, these children were "candidates for first failure by annual retest." Fourteen, or 3.2 percent, failed. The failure rate was 4.7 percent for the children under 10 years of age and 2.2 percent for those 10 years old or older.

Valid conclusions on the effectiveness of annual retesting of hearing cannot be drawn from a biennial testing program. In this study, some children were tested after a 1-year interval because of suspected hearing loss or repetition of a grade. However, appreciable numbers of children, particularly in the younger age groups, show hearing impairment some of the time within a 2-year interval. The only way to determine the value of annual retesting is to study the number of new cases found in an annual testing program.

Hearing Impairment on Entering School

An appreciable amount of hearing loss undoubtedly starts in the preschool years. Therefore, in the age group 5-7 years, children who

had hearing impairment at the time of the first audiometric test were compared with children who had normal hearing in the early school years but subsequently failed a hearing test. Criteria selected for comparison were continuity and severity of hearing impairment and involvement of one or both ears.

The 31 young children who had hearing difficulty when they entered school had the lowest proportion of "temporary-short" impairment of hearing, that is, no audiometric test failures after the first failure. Their percentage of temporary-short involvement was 36 compared with 63, 42, and 50, respectively, among the children who had normal hearing on admission but first failed a test in the later age groups (28 children in the 8-9 group, 15 in the 10-11 group, and 11 in the 12-13 group). The moderate difference between the entering pupils and older pupils is more noteworthy because it is directly contrary to the relatively common occurrence of temporary loss of hearing in the younger children as a whole. Four-fifths of the temporary-short failures in the study group occurred before 10 years of age. This tends to support the belief that the hearing impairment in entering pupils was not an acute transient episode but had been present prior to admission to school.

The same young children showed other evidence of having greater hearing damage than the older groups. At the time of first failure of

Table 6. Number and percentage distribution of children and separate ears ever failing an audiometric test, according to chronicity of hearing defect

[In rank order of frequency]

Chronicity	Number		Percent	
	Children	Ears	Children	Ears
Total.....	116	177	100.0	100.0
Temporary short ¹	47	81	40.5	45.8
Continuous ²	33	42	28.5	23.7
Temporary extended ³	20	26	17.2	14.7
Indeterminate ⁴	8	10	6.9	5.6
Intermittent ending in failure ⁵	4	10	3.4	5.6
Intermittent ending in pass ⁶	4	8	3.4	4.5

¹ Failing 1 test only and passing subsequently.

² Failing all tests after first failure.

³ Failing consecutive tests more than once but ending in a pass.

⁴ Passing all tests except the last.

⁵ Passing a test between failures and ending with a failure.

⁶ Passing a test between failures and ending with a pass.

an audiometric test, the children in the youngest age group had a much higher percentage of bilateral involvement (71 percent) than those in the other three age groups (38, 47, and 45 percent, respectively), as well as greater severity of hearing loss in the middle frequency range. Average weighted scores of severity of hearing impairment for the four age groups were 150, 136, 86, and 50, respectively. Weights of 100, 200, and 300 were given for slight, moderate, and severe involvement of the middle frequency range. Poorer audiometric scoring in the youngest group is all the more meaningful in the face of the greater average acuity of hearing that is believed to be normally present in the early years.

Bilaterality and severity of hearing impairment may be related to age differences alone. One demonstrable age correlation in the total study population was the finding that younger children who fail an audiometric test show loss of hearing over a wider spread of frequencies than do the older children, whose hearing impairment is more likely to be focused on a narrower range of frequencies. The decrease in involvement of ranges with increasing age took place in the lower and middle frequencies rather than in the high tones. Age differences did not apply when hearing loss exceeded 40 decibels.

The extent to which a child suffers from his

hearing impairment is greatly influenced by whether one or both ears are affected. Among the 116 children who ever failed an audiometric test, laterality of involvement was known for 111. Half of these had bilateral loss of hearing at the time of first failure of an audiometric test. Among the group 5-7 years old, 69 percent of all failures were bilateral compared with 45-47 percent in each of the three older age groups.

Impact Upon Academic Progress

The possible effect of hearing impairment on a child's school work was studied in three ways: by age on admission to school, by repetition of academic grades, and according to grade at the end of observation.

Age of Admission to School

Among the children admitted to school at the normal age level (below 7 years), 5.9 percent ever failed a hearing test during the study period compared with 11.5 percent of those whose admission to school had been delayed. This is a statistically significant difference ($\chi^2=11.8$ $P<.001$), which may connote that undiscovered hearing loss was associated with and may have contributed to delay in acceptance at school. Also, 16 of the 28 children whose admission to school was delayed and who failed an audiometric test at some time failed the first time they were tested.

Intermittent hearing loss may exist prior to as well as after admission to school. Among the children who entered school late but passed the first audiometric test, the failure rate in the group aged 8-9 years was 3½ times the rate among children who were admitted to school at 5-7 years of age and passed their first audiometric test.

Gross delay in admission to school probably results from causes other than hearing defect. Among 218 children who entered school 1 and 2 years late, 12.0 and 13.5 percent, respectively, ever failed an audiometric test whereas, among the 26 children admitted to school 3 or more years late, only one instance of hearing loss was then or subsequently discovered (table 7).

The delay in receiving the first audiometric test was appreciably greater than usual among

Table 7. Total number of children and number and percentage with unfavorable audiometric test history, according to age at admission to first grade

Age level at time of admission to first grade	Total children ¹	Ever failed test	
		Number	Percent
Total-----	1, 724	116	6. 7
Normal ² -----	1, 480	88	5. 9
1 year behind-----	166	20	12. 0
2 years behind-----	52	7	13. 5
3 and 4 years behind-----	26	1	3. 8

¹ Excludes 2 children whose age at time of admission was unavailable.

² Below 7 years.

NOTE: Chi-square based on 2 x 2 table for normal age level and 1 year behind, $\chi^2=11.73$ $P<.001$; and for normal age level and 2 years behind, $\chi^2=5.85$ $P<.02$.

Table 8. Total number of children and number and percentage who repeated one or more grades, according to audiometric test history

Audiometric test history	Total children	Repeated one or more grades ¹	
		Number	Percent
Total.....	² 1, 722	333	19. 3
Never failing.....	² 1, 606	294	18. 3
Ever failing.....	116	39	33. 6

¹ Excludes children admitted to first grade under 6 years of age who repeated the first grade only.

² Excludes 4 children whose record of grade repetition was unavailable.

NOTE: $\chi^2=14.89$ $P<.001$.

children who entered school late. Because these children often deviated from the routine grade placement, they tended to miss the scheduled tests for their group and to have recognition of their hearing impairment still further postponed.

Repetition of Academic Grades

Children who ever had hearing impairment during their school lives were twice as likely to repeat a grade as were other children (table 8). The magnitude of the impact of hearing impairment on academic status can also be sought through the grade repetition ratio, or the total number of grades repeated per 100 children. This ratio was 46 among children who ever failed an audiometric test compared with 20 among those who never showed hearing impairment. Thus, a child with a hearing defect not uncommonly repeats more than one academic grade during his school career.

In the present study it was not possible to examine the time relationship between hearing loss and school work because the data gave time of recognition of hearing loss rather than time of onset and time of repetition of a grade rather than time of the beginning of poor academic work. Comparison of age of grade repeaters with nonrepeaters at first audiometric test failure and separate comparison of audiometric test failers with nonfailers at first repetition of a grade showed no meaningful differ-

ences. There was no significant pattern of time relationship between first audiometric failure and first repetition of a grade in the 39 children who had both. Furthermore, there was greater delay in the time of audiometric testing of children who repeated grades than in the testing of other children, again apparently due to their falling out of step with the grades of their fellow pupils and being missed by the routine biennial testing program.

Grade at End of Observation

A combination of factors determines a child's academic status at the end of his school career. Therefore, the grade-age relationship at the end of the observation period was set up as the third index of possible impact of hearing impairment upon school work. Among the 114 children who ever failed an audiometric test, 38.6 percent had not reached their normal academic grade level at the terminal point of the study, whereas only 24.4 percent of the 1,609 children who had not shown hearing impairment at any time in their school career were behind their expected grade at the end ($\chi^2=13.66$ $P<.001$). The audiometric failure rate was far greater among children 2 years behind their age group than among those 1 year behind, and 3 times as high as among children at

Table 9. Number and percentage distribution of children with unfavorable audiometric test history, according to age-grade relationship at last observation

Age-grade relationship	Number tested ¹	Ever failed a test	
		Number ²	Percent
Total.....	1, 723	114	6. 6
Normal age level.....	1, 286	70	5. 4
1 year behind.....	246	17	6. 9
2 years behind.....	124	21	16. 9
3 and 4 years behind...	67	6	9. 0

¹ Excludes 3 children whose grade classification was unavailable.

² Excludes 2 children whose grade classification was unavailable.

NOTE: Chi-square based on 2 x 2 table for normal age level and 2 years behind, $\chi^2=28.94$ $P<.001$; 1 and 2 years behind, $\chi^2=9.08$ $P<.01$; normal age level and 3 and 4 years behind, $\chi^2=1.12$ $P<.30$.

normal grade level. In the group with 3 or 4 years of total academic retardation, however, the proportion with hearing impairment dropped, suggesting that other factors, such as mental retardation, entered more fully into the picture (table 9).

Detailed analysis of the longitudinal history of the children revealed a number of characteristic pictures. One group had hearing loss from the beginning and consistently thereafter. Half of these had fallen 2 or more years behind their normal academic level at the end of the study. These children usually had severe bilateral hearing impairment.

Early in their school careers, the children who probably had had a hearing defect prior to admission to school were grossly retarded academically. They were delayed in being admitted to school, missed their audiometric tests for varying lengths of time after admission, and repeated one or more grades before their hearing impairment was recognized. Strangely enough, half of them had only unilateral hearing defect. The nature of the hearing loss and its tendency to eventual improvement suggested an infectious etiology rather than that organic brain damage was the common basis for a nerve type of hearing impairment associated with mental retardation. Unfortunately, information on clinical findings and intelligence testing was not consistently available. In a number of slow-learning children, superimposed mild or moderate hearing impairment seemed to constitute a considerable handicap.

Prognosis

In order to make a retrospective appraisal of the prognostic implications of early audiometric test findings, the following indexes of the course of hearing impairment and its end results were established: chronicity; severity of hearing loss at the last audiometric test in different frequency ranges, especially the middle frequencies; and impairment of hearing in one or both ears at the last test. These indexes were analyzed in relation to (a) hearing impairment in frequency ranges at first test failure, (b) hearing impairment in combinations of frequency ranges at first failure, (c) severity of hearing impairment in the three frequency

ranges at first failure, (d) greatest severity of involvement in the three frequency ranges during the period of observation, and (e) consistency of laterality of hearing impairment.

Frequency Ranges

Among the children followed for 3 or more years after failure of an audiometric test, there was general correlation in the group as a whole between the number and severity of hearing impairments in any one of the three frequency ranges at the time of first test failure and the persistence and degree of loss in that same range at the time of the last test. The correlation held more strongly for high tones than for middle tones and for middle tones than for low tones.

Combinations of Ranges

Table 10 gives the percentage distribution of frequency ranges and combinations of ranges at the time of first failure of the ears that ever failed an audiometric test. Table 11 shows that among the 148 ears for which data on chronicity of hearing impairment were available, 25 percent had continuous audiometric test failure. The direct correlation between height of early hearing impairment on the frequency range scale and tendency of hearing deficit in that same frequency range to persist also was evident when combinations of two frequency ranges were affected at the first failure of a test. The rank order of percentage of continuous failure after early dual range involvement

Table 10. Distribution of combinations of frequency ranges affected at time of first failure of audiometric test by an ear

[Arranged in rank order of percentage distribution]

Combinations of frequency ranges	Number ¹	Percent
Total.....	158	100.0
Low, middle, and high.....	71	44.9
Low and middle.....	23	14.6
Middle and high.....	22	13.9
High only.....	20	12.7
Low and high.....	8	5.1
Low only.....	8	5.1
Middle only.....	6	3.8

¹ Excludes 19 ears for which audiogram of first audiometric test failed was unavailable.

Table 11. Number and percentage of classes of chronicity¹ of hearing impairment, according to combinations of frequency ranges affected at time of first failure of an ear

[Arranged in rank order of percentage distribution of continuous impairment]

Combinations of frequency ranges	Total ²	Number		Percent	
		Continuous	Temporary and intermittent	Continuous	Temporary and intermittent
Total.....	148	37	111	25.0	75.0
Middle and high.....	22	14	8	63.6	36.4
High only.....	17	7	10	41.2	58.8
Low and high.....	5	1	4	20.0	80.0
Low and middle.....	23	4	19	17.4	82.6
Middle only.....	6	1	5	16.7	83.3
Low, middle, and high.....	67	9	58	13.4	86.6
Low only.....	8	1	7	12.5	87.5

¹ See footnotes to table 6.

² Excludes 10 ears with "indeterminate impairment" and 19 ears for which audiogram of first audiometric test failed was unavailable.

was: high plus middle, high plus low, and middle plus low.

With one exception, hearing impairment in two ranges increased the tendency to continuous hearing failure, as follows:

High plus middle was more chronic than high alone.

High plus middle was more chronic than middle alone.

High plus low was less chronic than high alone (the exception).

High plus low was more chronic than low alone.

Middle plus low was more chronic than middle alone.

Middle plus low was more chronic than low alone.

When hearing impairment existed in all three frequency changes, however, continuous failure was least likely.

Since the middle frequencies are the ones essential to functional hearing of speech, it is important that the prognostic significance of early loss of hearing in any frequency range must be assessed in relation to the end point of hearing impairment for the middle frequency range. Detailed analysis helps to explain the rank order of the frequency ranges in respect to their seeming prognostic significance for continuity of hearing impairment (table 11). Although the numbers of ears tested are small,

the differences in chronicity of hearing impairment in the middle frequency range are striking.

Four possible patterns of combination of frequency ranges include the high range. The highest percentages of continuous hearing impairment occurred when hearing impairment at the time of first audiometric test failure had been found in 3 of these 4 combinations (table 11). At first glance, this would suggest that any loss of hearing in the high range at the time of first failure of an audiometric test has great significance for continuity of hearing impairment. From a practical viewpoint, however, this is not so. The correlation existed only with the definition used for failing a threshold test, not with ultimate functional hearing as judged chiefly by middle frequency range loss.

End-point middle frequency range loss of hearing evidently related back to early middle range loss and did not occur to more than a slight extent when no loss of hearing in the middle frequency range had existed at the time of first failure of an audiometric test (table 12). Observation of these children over a longer period of time is necessary to determine whether the slight impairment of hearing in the middle frequency range that sometimes occurred ever becomes more significant. When the first test failure consisted of loss of hearing

in the high frequency range only, the high proportion of continuing failure of the audiometric test was made up almost entirely of persistent failure in the high range exclusively. Only 3 of the 13 ears in this group whose continuous failure of audiometric tests spanned 3 or more years developed even a slight degree of hearing loss in the middle frequency range. As an added check, audiograms were studied of 20 ears in 15 children which had been labeled

"borderline" rather than test failures. These children had shown some loss of hearing at the 6,000 or 8,000 frequency at one time or another but the loss was not enough to drop the high frequency range average below the passing standard. The majority of these children were 8 years of age when hearing loss was first noted and 13 of them were boys. The amount of loss was usually less than 50 decibels, in which case it disappeared within 1 or, at most, 2 years.

Audiometric School Testing Program

ADMINISTRATIVE RECOMMENDATIONS

The administrative recommendations listed below are based upon the findings of the study as they seem to fit together with other experiences, observations, and reports in the field of audiology and in school health programs. The word "school" applies to all grades through high school, without regard to structural or organizational separation. It is not intended that elementary, junior high, and high schools should treat their entering students as entirely new to an audiometric testing program but that continuity in testing should be attained by effective coordination of programs and prompt transfer of health records with the students.

1. School systems and health departments should work jointly for the development of comprehensive routine hearing screening programs among children of preschool age.

2. Organization of the audiometric test programs in schools should be based on ages of children rather than on grade grouping.

3. Screening tests should be given routinely:

a) To all students entering school for the first time. (Highest priority for prompt testing should be given to this group.)

b) Annually to all children under 10 years of age, except those who have ever had hearing impairment.

c) Possibly to all children just prior to their leaving school, espe-

cially among those who terminate their schooling before graduation.

4. Screening tests should be limited to the middle frequency range (500, 1,000, 2,000 decibels).

5. A makeup test should be arranged as soon as possible when children miss taking their routine tests, especially if these children fall into one of the special referral categories listed immediately below.

6. On referral, screening tests should be given to school children of any age when:

a) The teacher, parent, or child himself, suspects hearing is not normal.

b) Infections or allergic involvement of ear, nose, or throat are frequent or excessive.

c) Absenteeism is marked. (Criteria in terms of frequency, length, number, and type of absences, and ages of children should be established by the school health service.)

d) Academic work is poor. (Criteria should be established by the school according to its pattern of instruction and grading.)

7. Special effort should be made to obtain a test of hearing whenever a child has not entered school at the usual starting age.

When hearing impairment could be a contributing factor, no child should be denied admission or delayed in admission to school for supposed mental retardation or other

reason without attempting a test of hearing.

8. When a child fails a first screening test, the audiometric test should be repeated the same day, possibly with partial threshold testing in the middle frequencies. If he fails a second time:

a) His classroom teachers should be informed immediately of the possibility of hearing impairment.

b) A questionnaire on his earlier and recent hearing history should be filled out by the parents and child.

c) He should be given a threshold test covering frequencies 250-8,000 approximately 3 weeks afterwards, or later if respiratory infection is present.

9. When a child fails a threshold test:

a) The school health service should arrange to have him examined by an otologist.

b) He should be referred to the family physician or to the family's usual resource for medical care, and the parents should be given an interpretation of the audiometric test results and the otologist's findings.

c) Attempt should be made to send reports to the physician who treats the child.

d) Prompt and persistent follow-up steps should be taken by the school and the school health service to assure adequate care. Frequent threshold retesting may help to motivate the family toward medical care as well as to measure the child's progress.

The six children who had 50 decibels or more of loss retained this loss with minor fluctuations throughout the period of observation but never developed any other impairment sufficient to fail an audiometric test.

In the small group of five cases with the pattern of loss of hearing in the low plus high frequency ranges at the first failure of an audiometric test, the one ear that did not ultimately pass the test showed only slight loss of hearing

in the middle range frequency (table 12). Among the infrequent cases of initial loss of hearing in the low range only, one ear showed slight hearing deficit after 3 or more years.

It seems safe to conclude that if a child has or is likely to develop appreciable difficulty in hearing speech, this can usually be detected by audiometric testing of the middle frequency range only. Therefore, in sweep check screening tests time should not be spent on the low and

10. Once a child has been found to have hearing impairment:

a) He should be removed from the screening program and thereafter be given appropriate supervision and his hearing threshold should be tested as frequently as indicated by his clinical and academic progress.

b) Mild hearing impairment in a child becomes more handicapping when it is associated with some degree of mental retardation. Such a child should have as complete audiologic and psychological appraisal as possible so that an appropriate program can be planned for him.

c) Decision on modification of any child's education because of hearing impairment should first be based on his immediate needs rather than on the prognosis and thereafter

on careful observation and frequent reappraisal of the child rather than on the mere nature of his audiometric score. This works in two directions. On the one hand, mild loss of hearing on the audiogram with a clinical picture that usually bears a good prognosis does not preclude prompt aggressive treatment, possibly the temporary use of a hearing aid, and adaptations in the child's educational program. On the other hand, when the prognosis seems poor, definitive acceptance of that prognosis should be postponed and long-term educational and vocational plans should not be made until longitudinal observation and treatment for at least 2 years have permitted a more valid estimate of the ultimate outcome.

4. In a routine screening program limited to as few as three frequencies, it may be desirable and feasible to do a threshold test rather than a sweep check test. The threshold test might detect changes in a child's hearing in successive years even within the usual passing level, and it would establish for each child his own individual norm rather than pegging all children at the same norm.

With the use of antibiotics, otologists have been reporting the common occurrence of nonpurulent collections of fluid in the middle ear chambers, producing an initial drop in hearing of as little as 10 decibels. Prompt recognition of this relatively minor degree of impairment might lead to early and aggressive therapy and to prevention of permanent damage.

5. In the opposite direction to moving from a sweep check to a threshold test, there may be effective shortcuts to case finding. Comparative studies should be made on the use of a single frequency, such as 1,000, or of some sound other than a pure tone but composed primarily of the middle frequencies. Verbal tests need further analysis. These have been discussed by Lee Meyerson in *Hearing for Speech in Children: A Verbal Audiometric Test* (Supplementum 128 to *Acta Oto-Laryngologica* 1956).

6. Evaluation should be done of the case-finding effectiveness of the several special referral criteria suggested in this paper.

7. Time and cost studies of the various audiometric screening methods are essential to help determine the most practicable procedures for testing large numbers of children.

SUGGESTIONS FOR RESEARCH

A variety of audiometric screening methods deserve comparative studies.

1. The increment of new cases found by an annual retest should be studied in a school screening program in which such annual testing is done routinely.

2. The effects on meaningful case finding of narrowing the span of screening to the middle frequencies and to the younger ages, as here recommended, should be studied in additional school programs.

3. If the pure tone sweep check method is used, studies should be done on the advisability of moving the screening decibel level closer to

the so-called zero line in the middle frequency range. The greater artifact of ambient noise in the low frequency range has heretofore been the major deterrent to establishing a more rigid passing standard for audiometric tests.

Change in the passing standard would also be in keeping with the greater acuity of hearing that is normally present in young children. Audiometers have been calibrated to fit the hearing of adults, not children. The case-finding and prognostic value of a more rigid passing standard in the middle frequency range should be checked by comparative studies.

Table 12. Combinations of frequency ranges affected at time of first failure of an ear, according to middle range involvement at time of last test

[Frequencies arranged in rank order of total percentage with middle range loss]

Frequency ranges affected at time of first failure		Ears having middle range loss at last test					
Combinations of ranges (1)	Number of ears ¹ (2)	Number			Percent of column (2)		
		Total (3)	Moderate and severe (4)	Slight (5)	Total (6)	Moderate and severe (7)	Slight (8)
Total	135	28	15	13	20.7	11.1	9.6
Middle and high	21	12	9	3	57.1	42.9	14.2
High only	13	3		3	23.1		23.1
Middle and low	19	4	3	1	21.1	15.8	5.3
Low and high	5	1		1	20.0		20.0
Low only	8	1		1	12.5		12.5
Middle, low, and high	64	7	3	4	10.9	4.7	6.2
Middle only	5						

¹ Number of ears with a 3-year span of test coverage after first failure. For observed differences in column (7), $\chi^2=18.76$ $P<.001$.

high frequency ranges. When, however, one moves from finding new cases by screening tests to assessing, treating, and educating children with known hearing impairment, knowledge concerning any associated impairment of hearing in the low and high frequencies is important. A number of findings indicate that low and high frequency ranges should be included when threshold tests are done on children with known or suspected loss of hearing.

The severity of end-point middle frequency range loss of hearing depended on early impairment of hearing in the middle frequency range in combination with 1 or 2 other frequency ranges (table 12) in the same rank order as the tendency of such combinations of ranges to persist (table 11), as follows: middle plus high, middle plus low, and middle plus high plus low.

Severity of Hearing Impairment

The mere presence at the time of first audiometric test failure of loss of hearing in either the low or high frequency range combined with impairment of hearing in the middle frequency range was more significant than the severity of early impairment in the low or high range. Among the ears with loss of hearing in the middle range plus high range at the first failure of an audiometric test, the group with

the highest proportion of persistence of hearing impairment (63.6 percent, table 11), there was no relationship between the severity of loss of hearing in the high range at the first test failure and loss of hearing in the middle range at the last test. There was, however, striking correlation between the severity of hearing impairment in the middle frequency range at the first and last tests.

Among the 19 ears with loss of hearing in the middle plus low frequency ranges at first failure of an audiometric test, the extent of first impairment of hearing in either the middle or low range had no relationship to whether an ear later passed or failed the audiometric test or to the severity of end-point middle frequency range loss of hearing when the ear did fail the test. Four ears showed audiometric test failure after the first test. In none of the rare instances of initial loss of hearing in the middle frequency range only was there any hearing impairment after a span of 3 or more years.

Of particular interest is the large group of ears that showed "across the board" loss of hearing in all three frequency ranges at the first failure of an audiometric test. Only 11 percent of these ears followed for 3 or more years had more than slight middle range loss at the last test. Even among 10 children who had severe

loss of hearing in all 3 frequency ranges at the first failure of an audiometric test, 9 finally passed the sweep check test. Therefore, among children attending day school, "across the board" loss of hearing on audiometric test usually is the result of acute rather than chronic hearing impairment.

In this study, loss of hearing in some of these children may have been due to impacted wax, although case histories indicated the frequent existence of nasopharyngeal infection. This finding is in keeping with the experience of clinicians that there is a general "flattening" of hearing level associated with acute middle ear infection and that this flattening moves either toward recovery or toward persistent loss of hearing of a less even nature. The broad span of frequencies affected in the flattening gives a favorable rather than an unfavorable prognosis as long as the impairment is not excessive.

The prognostic importance of "across the board" loss of hearing was borne out by a look at another group of children. This group was composed of seven children who were in the same age group as the study population and whose families resided in the Reading School District but who attended the State residential school for the deaf. All of these children had consistent "across the board" impairment of hearing from first to last tests, with much greater decibel loss than the children in the study. No child in the study population, for example, ever had an audiogram with every frequency reading at 60 decibels or more. Although severity and duration of "across the board" hearing impairment are of some assistance, it is not always possible to distinguish between the child whose hearing will clear up partially or completely and the child who will remain seriously handicapped. What is vital is the fact that the prognosis for many children with considerable hearing loss covering a wide spectrum of frequencies need not be a pessimistic one.

An attempt was made to derive prognostic significance from the greatest degree of hearing impairment in each frequency range in any ear during the study period. Continuity of failure of audiometric tests or intermittency of hearing impairment ending in failure of the

test correlated directly with increasing severity of the poorest test result in the middle frequency range. The correlation was even greater with poor test results in the high frequency range. On the other hand, the ears that remained normal in the low frequency range despite failing one or more audiometric tests had the poorest prognosis for chronicity of hearing impairment. Evidently, unevenness in audiometric test score is more indicative of probable persistence of hearing impairment than is "across the board" homogeneous severity of hearing loss. This applies not only to irregular impairment of hearing in the three frequency ranges but to uneven severity of hearing loss from one frequency to another within any range.

Laterality of Impairment

Some interesting prognostic inferences may be drawn from the data on consistency of hearing impairment of one or both ears in the same children. Among the 58 children who failed the audiometric test in more than 1 year, 38 percent had unilateral involvement only, 24 percent had bilateral involvement only, and 38 percent fluctuated between unilateral and bilateral involvement. In almost no instance did unilateral failure move from one ear to the other, and very rarely did hearing loss progress from unilateral to bilateral involvement. The change, if any, was usually in the other direction. In general, a better prognosis for hearing status at the last audiometric test was suggested when there was fluctuation between bilateral and unilateral hearing loss during a child's school career than if the loss was always unilateral or always bilateral (table 13).

At the end of the observation period, 13 children, or 8 per 1,000, had bilateral hearing loss of more than 30 decibels in the middle frequency range. Seven were in the school for the deaf; six were from the Reading School District biennial audiometric test program. These six children were the ones with a definite deficit for hearing speech. Four had had hearing difficulty when they entered school; two developed hearing difficulty later. In the entire study population, there was only one child who had had the same degree and type

Table 13. Number of children who failed more than one audiometric test and number and percentage of failures at time of last test, according to laterality of impairment in all test failures

Laterality of ear involvement when failing tests	Children failing more than 1 test	Failed last test	
		Number	Percent
Total.....	58	36	62.1
Always unilateral.....	22	17	77.3
Always bilateral.....	14	10	71.4
Mixed laterality.....	22	9	40.9

of hearing loss for 2 or more years but whose hearing at the last observation was no longer impaired to the same extent as at the beginning of the study. Information was not available on homebound children with other handicaps that could affect their hearing.

Summary

During an 8-year study of 1,726 school children aged 5-14 years in Reading, Pa., 116, or 6.7 percent, ever failed an audiometric test.

The increment of new cases of hearing impairment found by a biennial retest routine was 2.3 percent among "candidates" 8-9 years old, 1.0 percent in the group aged 10-11 years, and 0.8 percent in those 12-13 years old.

Among children 5-7 years of age who passed their first audiometric tests, 3.3 percent failed a subsequent test. Among children in this age group who failed their first audiometric test, 48.4 percent failed later tests. When children passed all their tests before 10 years of age, less than 1 percent failed thereafter.

Hearing impairment persisted without interruption in 28 percent of the children and in 24 percent of the ears that ever failed an audiometric test.

Young children whose hearing impairment was discovered about the time they entered school had more severe types of hearing impairment than other children, suggesting that the condition had probably existed for some time prior to admission to school.

Rates of delayed admission to school, delay in receiving audiometric tests, repetition of

academic grades, and retarded grade status at the end of the observation period were higher for children who ever failed an audiometric test than for other children. Moderate unilateral impairment of hearing as well as severe or bilateral loss of hearing seemed to constitute an educational handicap, especially during the early years of learning language, reading, and spelling, when missing parts of the sounds might almost completely prevent a child from grasping the meaning of what he hears.

Ultimate loss of hearing in the middle frequency range after failure of an audiometric test did not often occur unless there had been initial impairment of hearing in the middle frequency range. With initial middle frequency range loss of hearing alone, the prognosis was good; initial middle range plus low frequency range loss signified a poorer prognosis, and initial middle plus high frequency range loss, the least favorable prognosis.

Initial "across the board" loss of hearing in all three frequency ranges at 40 decibels or less usually denoted a good prognosis. More severe and early "across the board" impairment of hearing occurred in cases of persistent deafness.

Unevenness of audiograms in severity of hearing impairment and in frequency ranges gave a poorer prognosis than evenness except for the most severely affected ears.

Hearing impairment in 38 percent of the children who failed the audiometric test in more than one year was unilateral whenever they failed the tests, almost always in the same ear; in 24 percent, always bilateral; and in 38 percent, impairment fluctuated between unilateral and bilateral involvement. Such fluctuation gave a better prognosis than when hearing loss was always unilateral or always bilateral.

Eight children per 1,000 studied had an end point of bilateral hearing impairment of more than 30 decibels in the middle frequency range.

REFERENCE

- (1) Wishik, S. M., and Kramm, E. R.: Audiometric testing of hearing of school children. *J. Speech & Hearing Disorders* 18: 360-365, December 1953.

Milk Sanitation Honor Roll for 1956-57

Sixty-four communities have been added to the Public Health Service milk sanitation "honor roll," and 45 communities on the previous list have been dropped. This revision covers the period from January 1, 1956, to December 31, 1957, and includes a total of 266 cities and 70 counties.

Communities on the "honor roll" have complied substantially with the various items of sanitation contained in the milk ordinance suggested by the U. S. Public Health Service. The State milk sanitation authorities concerned report this compliance to the Public Health Service. The rating of 90 percent or more, which is necessary for inclusion on the list, is computed from the weighted average of the percentages of compliance. Separate lists are compiled for communities in which all market milk sold is pasteurized, and for those in which both raw milk and pasteurized milk is sold.

The suggested milk ordinance, on which the milk sanitation ratings are based, is now in effect through

This compilation is from the Division of Sanitary Engineering Services of the Bureau of State Services, Public Health Service. The previous listing, with a summary of rules under which a community is included, was published in Public Health Reports, October 1957, pp. 943-946. The rating method was described in Public Health Reports 53: 1386 (1938). Reprint No. 1970.

voluntary adoption in 477 counties and 1,398 municipalities. The ordinance also serves as the basis for the regulations of 34 States and 2 Territories. In 14 States and 2 Territories it is in effect statewide.

The ratings do not represent a complete measure of safety, but they do indicate how closely a community's milk supply conforms with the standards for grade A milk as

stated in the suggested ordinance. High-grade pasteurized milk is safer than high-grade raw milk because of the added protection of pasteurization. The second list, therefore, shows the percentage of pasteurized milk sold in a community which also permits the sale of raw milk.

Although semiannual publication of the list is intended to encourage communities operating under the suggested ordinance to attain and maintain a high level of enforcement of its provisions, no comparison is intended with communities operating under other milk ordinances. Some communities might be deserving of inclusion, but they cannot be listed because no arrangements have been made for determination of their ratings by the State milk sanitation authority concerned. In other cases, the ratings which were submitted have lapsed because they were more than 2 years old. Still other communities, some of which may have high-grade milk supplies, have indicated no desire for rating or inclusion on this list.

Communities awarded milk sanitation ratings of 90 percent or more, 1956-57

100 PERCENT OF MARKET MILK PASTEURIZED

Community	Date of rating	Community	Date of rating	Community	Date of rating
<i>Arizona</i>		<i>Georgia</i>		<i>Georgia—Continued</i>	
Graham County.....	10-16-1956	Albany.....	11-22-1957	Dalton-Whitfield	
Phoenix.....	2-1957	Athens-Clarke County..	4-2-1957	County.....	5-21-1957
<i>Colorado</i>		Atlanta.....	8-23-1957	Douglas.....	6-14-1956
Boulder County.....	12-14-1956	Augusta-Richmond		Griffin.....	11-14-1957
Colorado Springs.....	1-19-1956	County.....	11-9-1956	La Grange.....	12-20-1956
Denver.....	8-27-1957	Bainbridge.....	1-19-1956	Moultrie.....	5-22-1957
Pueblo County.....	2-2-1956	Baxley.....	8-14-1956	Quitman.....	5-8-1957
<i>District of Columbia</i>		Calhoun-Gordon		Savannah-Chatham	
Washington.....	3-12-1956	County.....	9-7-1956	County.....	9-25-1956
		Cartersville.....	1-30-1957	Statesboro-Bulloch	
		Columbus.....	1-18-1957	County.....	3-27-1957

Communities awarded milk sanitation ratings of 90 percent or more, 1956-57—Continued

100 PERCENT OF MARKET MILK PASTEURIZED—Continued

<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>
<i>Georgia—Continued</i>		<i>Indiana—Continued</i>		<i>Kentucky—Continued</i>	
Valdosta.....	4-18-1956	Vincennes.....	10- 3-1957	Trigg County.....	10- 5-1956
Waycross.....	8-30-1956	Warsaw.....	11-16-1956	Union County.....	5- 7-1956
<i>Idaho</i>		Winchester.....	5- 7-1956	<i>Mississippi</i>	
Idaho Falls.....	6-13-1956	<i>Kentucky</i>		Booneville.....	8-28-1957
<i>Illinois</i>		Anderson County.....	5-17-1956	Canton.....	11-14-1956
Chicago.....	6-13-1957	Barbourville.....	11-28-1956	Clarksdale.....	1- 9-1957
Evanston.....	3-13-1957	Bardstown-Nelson		Columbus.....	9-19-1956
North Shore municipal-		County.....	5-21-1957	Corinth.....	7- 9-1957
ities.....	3-20-1957	Bell County.....	4-19-1957	Eupora.....	2-23-1956
Glencoe.....		Benton.....	6- 7-1956	Greenwood.....	4-25-1956
Highland Park.....		Bowling Green-Warren		Grenada.....	9-24-1957
Kenilworth.....		County.....	7-22-1957	Hernando.....	1- 7-1957
Lake Bluff.....		Brandenburg.....	4-11-1957	Houston.....	6-26-1957
Lake Forest.....		Breckinridge County...	5-31-1956	Iuka.....	7-11-1957
Northbrook.....		Cadiz.....	10- 5-1956	Laurel.....	7-12-1956
Wilmette.....		Campbellsville.....	4- 5-1957	Louisville.....	11-23-1956
Winnetka.....		Covington.....	6-13-1957	McComb.....	8- 2-1956
Oak Park.....	3- 6-1957	Eddyville.....	6- 5-1956	Meadville.....	3- 7-1957
<i>Indiana</i>		Falmouth.....	4-26-1956	Meridian.....	6-18-1956
Anderson.....	5-22-1957	Frankfort.....	10-18-1957	Morton.....	7-24-1956
Berne, Bluffton, Warren		Georgetown.....	10-16-1956	New Albany.....	1-18-1956
area.....	1-17-1957	Greenville.....	6- 6-1956	Oxford.....	8-27-1957
Calumet region.....	4-24-1957	Hardinsburg.....	5-31-1956	Starkville.....	3-13-1957
East Chicago.....		Harrodsburg.....	2-20-1957	State College.....	3-13-1957
Gary.....		Hodgensville.....	2-14-1957	Tupelo.....	4- 9-1957
Hammond.....		Hopkinsville-Christian		<i>Missouri</i>	
Columbia City.....	6-26-1957	County.....	9-26-1957	Cape Girardeau.....	7-12-1956
Elkhart, Goshen, Nap-		Lawrenceburg.....	5-17-1956	Chillicothe.....	3- 5-1957
panee area.....	1-11-1956	Leitchfield-Grayson		Fulton.....	3- 7-1956
Evansville.....	12-20-1956	County.....	10-10-1957	Kansas City.....	8-17-1956
Frankfort.....	6-10-1957	Liberty.....	10-11-1956	St. Joseph.....	6-14-1957
Greencastle.....	1- 4-1956	Louisville-Jefferson		St. Louis County.....	3-28-1956
Indianapolis-Marion		County.....	4-19-1956	Sedalia.....	8- 7-1957
County.....	8-13-1956	Mayfield-Graves		Springfield.....	10-26-1956
Kokomo.....	2-19-1957	County.....	8- 2-1957	<i>Nevada</i>	
Lafayette.....	9- 7-1956	Maysville.....	7-23-1957	Clark, Lincoln, and Nye	
Lake County.....	3-25-1957	Monticello.....	7-20-1956	Counties.....	5- 1-1957
La Porte.....	5-25-1956	Morgantown.....	6- 5-1956	<i>New Mexico</i>	
Muncie.....	11-30-1956	Murray.....	3-16-1956	Albuquerque.....	10-26-1956
New Castle.....	9-28-1956	Newport-Campbell		Portales.....	9-28-1956
North Manchester.....	7- 3-1957	County.....	10-18-1957	<i>North Carolina</i>	
Peru.....	4-10-1957	Owensboro.....	5-17-1956	Alamance County.....	3-15-1957
Richmond.....	4-24-1957	Paducah.....	7-31-1957	Beaufort County.....	5-22-1957
Rochester.....	12-19-1956	Paris-Bourbon County...	5- 3-1956	Camden County.....	7- 5-1956
Salem.....	6-28-1956	Russellville.....	11- 7-1956	Charlotte.....	5- 7-1956
South Bend.....	3- 8-1956	Smithland.....	6- 6-1956		
Union City.....	7- 3-1957	Spencer County.....	6- 1-1956		

Communities awarded milk sanitation ratings of 90 percent or more, 1956-57—Continued

100 PERCENT OF MARKET MILK PASTEURIZED—Continued

<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>	<i>Community</i>	<i>Date of rating</i>
<i>North Carolina—Continued</i>		<i>Tennessee—Continued</i>		<i>Utah</i>	
Chatham County.....	8-13-1957	Decherd.....	11-20-1956	Logan.....	5- 4-1956
Chowan County.....	7- 5-1956	Dyersburg.....	11-14-1956	Salt Lake City.....	2-10-1956
Craven County.....	8-30-1957	Fayetteville.....	6- 7-1956		
Cumberland County.....	3-16-1956	Franklin.....	5- 3-1956	<i>Virginia</i>	
Durham County.....	8- 7-1956	Greeneville.....	6-19-1956	Alexandria.....	6-28-1957
Edgecombe County.....	10- 5-1956	Humboldt.....	6-19-1956	Blacksburg.....	8-16-1956
Forsyth County.....	2-22-1957	Huntingdon.....	10-29-1956	Bristol.....	11- 7-1957
Guilford County.....	9-26-1956	Jackson.....	6-20-1956	Christiansburg.....	8-16-1956
Halifax County.....	9-13-1957	Jefferson City.....	8-20-1956	Franklin.....	6- 7-1957
Jackson County.....	12-12-1956	Knoxville-Knox		Marion.....	11-29-1956
Lee County.....	3- 7-1957	County.....	9-25-1957	Norfolk.....	6- 1-1956
Lenoir County.....	2- 4-1957	Livingston.....	6- 8-1956	Portsmouth.....	3- 7-1957
Macon County.....	12-12-1956	Loudon.....	5-24-1956	Pulaski.....	8-17-1956
Montgomery County.....	10-22-1956	Manchester.....	10-12-1956	Radford.....	8-15-1956
Nash County.....	1-17-1957	Memphis.....	7-11-1957	Richmond.....	4- 6-1956
New Hanover County.....	5-24-1956	Milan.....	6-19-1956	Roanoke.....	6- 1-1956
Northampton County.....	9- 6-1956	Morristown.....	8-20-1956	South Boston.....	4-13-1956
Onslow County.....	5-29-1957	Murfreesboro.....	8-14-1957	Staunton.....	4-27-1956
Orange County.....	8-13-1957	Nashville-Davidson		Suffolk.....	6- 6-1957
Pamlico County.....	5-24-1957	County.....	10-28-1957	Waynesboro.....	12- 5-1957
Pasquotank County.....	7- 5-1956	Newbern.....	11-14-1956		
Perquimans County.....	7- 5-1956	Paris.....	11-17-1956	<i>Washington</i>	
Person County.....	8-13-1957	Shelbyville.....	5-17-1956	Spokane.....	10-24-1956
Rowan County.....	6-28-1957	Sparta.....	5-16-1956	Whitman County.....	11- 8-1956
Sampson County.....	8-27-1956	Sweetwater.....	11-27-1956		
Scotland County.....	5-30-1956	Tullahoma.....	10- 9-1956	<i>Wisconsin</i>	
Stanly County.....	12-11-1956	Winchester.....	11-20-1956	Appleton.....	1-10-1957
Swain County.....	12-12-1956			Ashland.....	10-10-1956
		<i>Texas</i>		Beaver Dam.....	2- 6-1957
		Brady.....	6-26-1957	Burlington.....	10-24-1956
		Brownwood.....	6-21-1957	Delavan.....	10-24-1956
		Cleburne.....	3-13-1956	Dodgeville.....	5-21-1956
		Dallas.....	10-19-1956	Eau Claire.....	2- 7-1957
		Falfurrias.....	6-22-1956	Elkhorn.....	10-24-1956
		Gladewater.....	2-19-1957	Fontana.....	10-24-1956
		Gonzales.....	6-21-1957	Fort Atkinson.....	10-24-1956
		Harlingen.....	6-14-1956	Green Bay.....	10-11-1957
		Houston.....	5-24-1956	Kenosha.....	7- 5-1957
		Jacksonville.....	6- 7-1956	La Crosse.....	1-29-1957
		Kerrville.....	4-11-1957	Lake Geneva.....	10-24-1956
		Kilgore.....	2-19-1957	Manitowoc.....	4-12-1957
		Mineral Wells.....	6-21-1957	Milwaukee.....	6- 8-1956
		New Braunfels.....	1-31-1957	Oshkosh.....	7-11-1956
		Plainview.....	6- 2-1956	Racine.....	7-12-1956
		San Angelo.....	8- 8-1957	Ripon.....	2- 6-1957
		San Antonio.....	4- 1-1957	Sheboygan.....	7-26-1957
		San Benito.....	6-14-1956	Walworth.....	10-24-1956
		Texarkana.....	3- 9-1956	Waupun.....	2- 6-1957
		Tyler.....	3- 5-1957	Williams Bay.....	10-24-1956
		Vernon.....	6-21-1957		
		Wichita Falls.....	2-19-1957		
<i>Ohio</i>					
Lima.....	10- 1-1957				
<i>Oklahoma</i>					
Ardmore.....	4-13-1956				
Bartlesville.....	2-26-1957				
Guthrie.....	5-22-1956				
Okmulgee.....	5- 8-1956				
Sulphur.....	2- 9-1956				
Tahlequah.....	5- 1-1956				
Tulsa.....	6-21-1957				
<i>Tennessee</i>					
Bristol.....	11- 7-1957				
Chattanooga.....	11-20-1956				
Clinton.....	5-29-1956				
Columbia.....	6- 7-1956				
Cookeville.....	10- 2-1957				
Copperhill.....	11-27-1956				
Cowan.....	11-20-1956				

Communities awarded milk sanitation ratings of 90 percent or more, 1956-57—Continued

BOTH RAW AND PASTEURIZED MARKET MILK

<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>	<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>	<i>Community and percent of milk pasteurized</i>	<i>Date of rating</i>
<i>Georgia</i>		<i>North Carolina</i>		<i>Texas—Continued</i>	
Cedartown, 96.9.....	8-31-1957	Cleveland County, 89.9..	9-10-1956	Fort Worth, 99.98.....	6-14-1957
Fitzgerald, 97.9.....	4-11-1957	Gaston County, 97.9....	7-19-1957	Longview, 99.....	2-20-1957
Marietta, 97.8.....	10-26-1956	<i>Oklahoma</i>		Lubbock, 99.4.....	6-14-1956
Newnan, 95.....	5- 3-1956	Elk City, 99.....	4-30-1956	Marshall, 98.....	1- 4-1957
Rome, 99.1.....	10-16-1957	Henryetta, 80.7.....	4-17-1956	Palestine, 99.2.....	10- 2-1957
Thomaston, 91.5.....	5- 3-1956	McAlester, 84.....	7-18-1956	Paris, 99.....	1-23-1957
Washington, 99.8.....	3- 1-1957	Norman, 99.....	1-16-1956	Waco, 99.76.....	3-19-1956
Winder, 99.....	3- 7-1957	Oklahoma City, 98.....	11- 9-1956	<i>Virginia</i>	
<i>Idaho</i>		Ponca City, 96.6.....	4-18-1956	Charlottesville, 99.6....	9-27-1957
Ada County, 96.....	1-11-1957	<i>Tennessee</i>		<i>Washington</i>	
<i>Kentucky</i>		McMinnville, 98.3.....	5-15-1956	Seattle-King County,	
Lexington-Fayette		<i>Texas</i>		99.7.....	4- 9-1957
County, 99.....	9-13-1956	Abilene, 90.....	10-10-1957	<i>West Virginia</i>	
Madisonville, 99.....	1-25-1957	Austin, 99.4.....	1-28-1957	Kanawha County, 99..	11-20-1956
Princeton, 96.5.....	2-21-1957	Brenham, 94.....	6-13-1956	Monongalia County,	
Somerset, 95.....	1-10-1957	Brownsville, 98.3.....	6-28-1956	97.8.....	8- 9-1957
<i>Missouri</i>					
Joplin, 97.....	12-13-1956				

NOTE: In these communities the pasteurized market milk shows a 90 percent or more compliance with the grade A pasteurized milk requirements, and the raw market milk shows a 90 percent or more compli-

ance with the grade A raw milk requirements, of the milk ordinance suggested by the United States Public Health Service.

Note particularly the percentage of the milk pasteurized in the vari-

ous communities listed. This percentage is an important factor to consider in estimating the safety of a city's milk supply. All milk should be pasteurized, either commercially or at home, before it is consumed.

Radiation Detection Through Hair-Root Changes

The amount of radiation a person has received may be measured by examining the hairs from his scalp if his head has been exposed, according to Dr. E. J. Scott and Dr. R. P. Reinertson of the National Cancer Institute, Public Health Service, who reported their findings in the September issue of the *Journal of Investigative Dermatology*.

The paper, "Detection of Radiation Effects on Hair Roots of the Human Scalp," describes a study of the hair roots of cancer patients undergoing radiation therapy at the National Cancer Institute.

As early as 4 days following radiation, abnormal changes, such as progressive thinning of the hair roots, were observed.

Employment Availability of Older People

EMPLOYMENT of older persons has been a subject of considerable interest in recent years. Much of this interest has centered on employment practices and the attitudes of society with respect to employment and retirement. Less attention has been given to the extent to which unemployed older people themselves are willing and are also physically able to enter the labor force.

The purposes of the study reported upon in this monograph were:

- To measure the individual's subjective assessment of his health and fitness for work.
- To devise a scale for measuring his degree of availability for entry into the labor force, assuming a suitable job opportunity existed.
- To determine how health, attitudes, family composition, and other factors are related to availability for entry or reentry into the labor force.

Methodology was considered to be equally as important as the data derived from the study. The report therefore emphasizes the methods employed, procedural difficulties encountered, and errors that were made, so that other communities interested in obtaining information on health or availability for work among older people might profit from this experience.

The study was conducted in Hagerstown, Md., in a sample of 1,114 dwelling units, 615 of which included one or more persons 45 years of age or older. An interview was conducted with only one of these older persons at each household. The sampling plan devised for the survey is adaptable to the use of many communities for health or employment surveys as well as for other purposes. This sampling method has been described by Woolsey in Public Health Monograph No. 40.

The questionnaire contained four sections. The first was used to obtain basic household and individual data, the second, to obtain informa-

tion on the health and limitations of the older person selected for interview. The questions in the third and fourth sections were asked alternatively of persons who were or were not in the labor force. These sections included questions on present or previous occupation, attitudes toward employment and retirement of older persons, and, for unemployed persons, conditions



No. 51

The accompanying summary covers the principal findings presented in Public Health Monograph No. 51, published concurrently with this issue of Public Health Reports. The author is with the Division of Public Health Methods, Public Health Service.

Readers wishing the report in full may purchase copies of the monograph from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of the major universities and in selected public libraries.

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Lawrence, Philip S.: Availability for work: Chronic disease and limitation of activity. Public Health Monograph No. 51 (PHS Pub. No. 556). 44 pages. U. S. Government Printing Office, Washington, D. C., 1958. Price 35 cents.

under which they would be willing or able to accept employment. Although the questionnaire was pretested and modified, a number of problems in the design of the schedule and wording of the questions became evident when the final form was used in the field. These problems are discussed in detail in the monograph.

Availability for Work

Comparisons between people over age 45 years who are in the labor force and those who are not reveal differences with respect to health, physical limitations, education, marital status, and attitudes toward employment and retirement. The magnitude of the differences shows that employed persons of these ages are a select group and that assumptions concerning the labor force potential of unemployed older persons cannot be made from studies on employed persons nor from usually available population statistics, such as age and sex.

A scale of availability for employment was developed from answers to questions about job-seeking activities, interest in applying for employment, and physical disability. About one-quarter of the men and one-eighth of the women between ages 45 and 65 years considered themselves available for work. Only about 6 percent of men and women over age 65 indicated that they would consider employment. These proportions vary when considered in relation to the length of time since last employment and the kinds of previous occupations. In general, occupational groups which require the least skill or experience contain the highest proportions of persons who consider themselves available for reemployment. The scale used to rate availability shows logical relationships to household characteristics, attitudes toward employment and retirement, sex, and age. Furthermore, the answers regarding specific conditions under which individual respondents would be willing to accept employment were, in the main, consistent with other answers given in the interview. For example, among persons rated high in employment availability, the type of work that they would consider applying for was consistent with their previous experience and educational level.

Although availability for work is associated

with health, still about one-quarter of the people who said they would consider employment had reported both chronic conditions and limitations of activity. In assessing the potential for employment of older people it is not sufficient to obtain information only on willingness to work. Information is also needed on degrees of physical limitations that may constitute practical barriers to employment.

Illness and Limitation of Activity

The primary purpose of obtaining information on chronic illness and limitations was to relate it to employment availability. However, it was thought that there is enough current interest in health surveys to warrant a discussion of this subject in a separate section of the monograph. Since the collection of a large volume of morbidity data was not a primary objective of the study, the data from the sample of 600 households in Hagerstown cannot be generalized to other areas but may be useful as guides in health survey planning in other areas.

This survey differs from most household illness surveys in that each person on whom information was obtained responded for himself. This avoids any bias, particularly with respect to sex differences, that results from acceptance of proxy respondents. In this study, as in others, women have a higher prevalence rate of chronic conditions than do men of corresponding ages. The higher rate for women exists only from conditions reported to be of an episodic nature. More severe conditions affecting the respondent "all the time" existed in equal proportions of men and women.

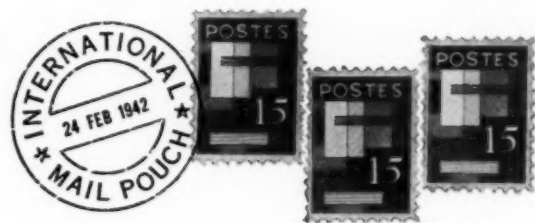
Ninety percent of the men between the ages of 45 and 64 years who were not in the labor force reported one or more chronic conditions which affected them all the time. Only 14 percent of men 45 to 64 years old who were in the labor force reported such conditions. Similar differences, though not to such a marked degree, exist for women 45 to 64 years of age and for men and women aged 65 years and over. No association between labor force status and the prevalence of chronic conditions which affect the person only "off and on" are evident from this study.

A qualitative scale of activity limitations was

tried in the Hagerstown survey and no difficulties were encountered in its use. The scale ranged from reduction in various types of activity to confinement in a bed or chair.

The degrees of limitation were related to age, sex, employment status, availability for work,

and type and severity of conditions reported. Associations found indicate that a qualitative scale of limitations is a useful yardstick for measuring disability and may, for certain purposes, be more practical than quantitative measures such as days in bed.



Mexican Medical Curriculum

Teaching preventive medicine and public health at 10 medical schools in Mexico has been stimulated through a project of the Dirección de Estudios Experimentales en Salubridad Pública. Three more medical schools have established departments of preventive medicine and 7 others are collaborating with the Dirección. A University of Guadalajara professor, studying at the School of Public Health under a Dirección scholarship, will return to head his school's department of preventive medicine. Through several projects a total of 17 physicians and 4 nurses are studying on Dirección scholarships at the School of Public Health.

—TROIS E. JOHNSON, M.D., M.P.H., *formerly chief, health, welfare, and housing field party, U. S. Operations Mission, Mexico.*

Disease Intelligence Center

The Philippines' Department of Health is planning a disease intelligence center to provide information for the prevention and control of disease. Communicable illnesses are still the country's major health problem and many are unidentified and unrecognized. Sudden outbreaks often reach epidemic proportions.

The center will centralize three preventive medicine disciplines—statistics, epidemiology, and laboratory—and supply data to plan and evaluate health

services involved in preventing and controlling communicable diseases. To provide maximum facilities and personnel, the center will coordinate the cooperating hospitals, medical schools, and other government agencies.

The center will employ a special mechanism for reporting unusual outbreaks of disease, using city, provincial and rural health personnel, private physicians, hospitals, school authorities, and other selected sources. The information the center collects will supplement the usual morbidity and mortality reports.

—FRANK S. MORRISON, *analytical statistician, U. S. Operations Mission, Philippines.*

Jiquilisco's Health Center

The people of Jiquilisco, El Salvador, wanted a health center so much that at a general meeting they donated close to 25 percent of the materials as well as the labor and transportation needed to build it. The sanitarian consultant has been working with the USOM community development specialist, organizing a program for this town of 6,000.

—VERNON R. SCOTT, *sanitarian consultant, Health and Sanitation Division, U. S. Operations Mission, El Salvador.*

First Rural Health Unit

The first rural health unit in Liberia was dedicated at Salala in the Central Province. The unit has a 5-bed ward, delivery room, clinic, combination drug room and laboratory, and waiting room. A midwife, nurse, and dresser staff it, and a doctor visits once a week. The rural health center is part of the effort to extend services to women and children.

—E. MASTHOFF, M.D., *Health and Sanitation Division, U. S. Operations Mission, Liberia.*

publications

How to Study the Nursing Service of an Outpatient Department

PHS Publication No. 497. 1957. By Apollonia O. Adams. 75 pages. 50 cents.

Intended primarily as a guide with which nursing personnel and nursing service administrators of an outpatient department can study how closely their services relate to the goals of their agency or institution and to the goals of good nursing service, this manual can be used to analyze functions and needed skills of all personnel under nursing supervision.

The manual is a collection of a series of studies, such as utilization of nursing personnel, patient waiting, facilities for teaching, record flow in relation to nursing service, and other factors which affect nursing personnel. These can be made individually or as one large study.

This is the fourth in a series developed by the Division of Nursing Resources, Public Health Service, for use by hospitals and others desiring to study nursing services.

The Clinical Center: Current Clinical Studies and Patient Referral Procedures

PHS Publication No. 284. Revised 1957. 32 pages.

Intended for physicians interested in the possibility of referring patients for study to the Clinical Center, National Institutes of Health, Public Health Service, this revised brochure outlines the referral procedures in detail.

The principal study projects for which patients are currently being admitted, and some of the more important diagnostic or other criteria for admission are described briefly.

This publication is revised period-

ically. Hospitals, clinics, medical schools, medical societies, medical journals, and individual physicians will be placed on a mailing list on request to the Director of the Clinical Center, National Institutes of Health, Public Health Service, Bethesda, Md.

The Cancer Quacks

PHS Publication No. 559. 1957. By Charles S. Cameron. 18 pages.

The dangers to life and health for those who fall victim to cancer quacks are set forth with force and clarity in this chapter from Dr. Cameron's book *The Truth About Cancer*, written for the layman.

He describes the three kinds of quack, the quacks themselves, and their patients, and tells what can be done about quackery.

The policy of the National Cancer Institute, Public Health Service, regarding investigation or evaluation of proposed cancer treatment is given in the appendix.

The Older Person in the Home

PHS Publication No. 542. 1957. 34 pages. 20 cents.

Families with older members living in their homes are given specific suggestions for health and happiness in the three-generation household. Some of the most common problems confronting them, physical, mental, and emotional, are discussed.

One section of the booklet is devoted to the more difficult problems that arise when the eldest member is seriously handicapped, and another section gives pointers to consider if it seems necessary for the aged person to move into a nursing home or old people's home.

Although addressed primarily to the housewife, as the key person in the household, the booklet will also

be of interest to public health workers, social workers, religious leaders, and others who provide services to elderly persons and their families.

A bibliography, including available films, is provided.

Municipal Water Facilities, Communities of 25,000 Population and Over

PHS Publication (unnumbered). 1957. 163 pages.

Water supply data for organized community water facilities of approximately 850 municipalities in the United States and Territorial possessions as of December 31, 1956, are inventoried. These data reflect changes during the previous year.

The inventory is designed to aid industry and government in planning broad water developments as well as in planning for industrial expansion and national emergencies.

Information Leaflet

THE FOOD YOU EAT AND HEART DISEASE. *PHS Publication No. 537. (Health Information Series No. 89) 1957. 11 pages. \$5.00 per 100.* Answers many questions asked by the general public on relation of diet to cardiovascular disease. Gives five diet tips for people with any kind of heart disease.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared by other Federal agencies.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications other than its own.
